NWD2705

Dual-Band Wireless N450 USB Adapter

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User's Guide

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IMPORTANT!

READ CAREFULLY BEFORE USE.

KEEP THIS GUIDE FOR FUTURE REFERENCE.

Screenshots and graphics in this book may differ slightly from your product due to differences in your product firmware or your computer operating system. Every effort has been made to ensure that the information in this manual is accurate.

Related Documentation

- Quick Start Guide

  The Quick Start Guide shows how to connect the NWD2705 and set up your network.

- Online Help

  Embedded web help for descriptions of individual screens and supplementary information.

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PART I
Introduction and Configuration

1

Getting Started

1.1 Overview

The ZyXEL NWD2705 is a dual-band wireless USB adapter, which can connect to a 2.4 G network or a 5G netowrk and bring you a better Internet experience over existing 802.11 networks. With data rates of up to 450 Mbps, you can enjoy a breathtaking high-speed connection at home or in the office. It is an excellent solution for daily activities such as file transfers, music downloading, video streaming and online gaming.

This section includes:

- About Your NWD2705 on page 12
- Application Overview on page 13
- Hardware and Utility Installation on page 13
- Configuration Methods on page 14

1.1.1 What You Need to Know

The following terms and concepts may help as you read through this section, and subsequently as you read through the rest of the User's Guide.

Access Point

An Access Point (AP) is a network device that acts as a bridge between a wired and a wireless network. Outside of the home or office, APs can most often be found in coffee shops, bookstores and other businesses that offer wireless Internet connectivity to their customers.

Infrastructure

An infrastructure network is one that seamlessly combines both wireless and wired components. One or more APs often serve as the bridge between wireless and wired LANs.

1.1.2 Before You Begin

Read the Quick Start Guide for information on making hardware connections and using the ZyXEL utility to connect your NWD2705 to a network.

1.2 About Your NWD2705

Your NWD2705 is an IEEE 802.11n compliant wireless LAN adapter. It can also connect to IEEE 802.11b/g wireless networks. The NWD2705 is WPS (Wi-Fi Protected Setup) compliant. WPS allows you to easily connect to another WPS-enabled device.

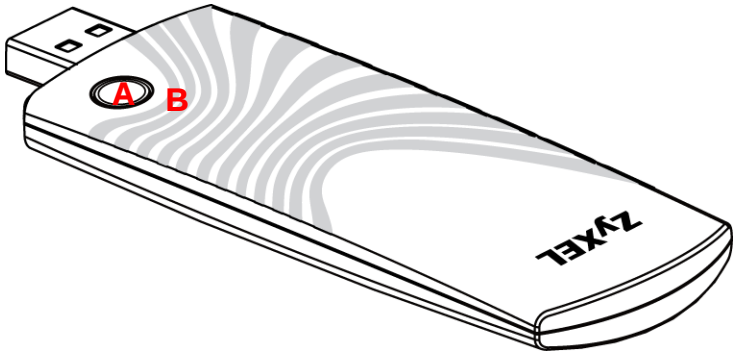
The NWD2705 is a USB adapter which connects to an empty USB port on your computer.

See your NWD2705's Quick Start Guide for installation instructions, and see the section on product specifications in this User's Guide for detailed information.

1.2.1 Hardware

This section describes the NWD2705's physical appearance.

Figure 1 The NWD2705



The following table describes the NWD2705.

Table 1 NWD2705 External View

LABEL	DESCRIPTION
A	WPS button
B	LED

The following table describes the operation of the NWD2705's LED.

Table 2 NWD2705 LED

COLOR	STATUS	DESCRIPTION
Blue	On	The NWD2705 is turned on and the driver is installed.
	Slow Blinking	The NWD2705 is searching for available wireless device.
	Rapid Blinking	The NWD2705 is turned on, connected to a wireless device, and is transmitting or receiving data. It also blinks when the WPS feature is being used or a WPS connection is being initiated.
	Off	The NWD2705 is turned off or the driver is not installed.

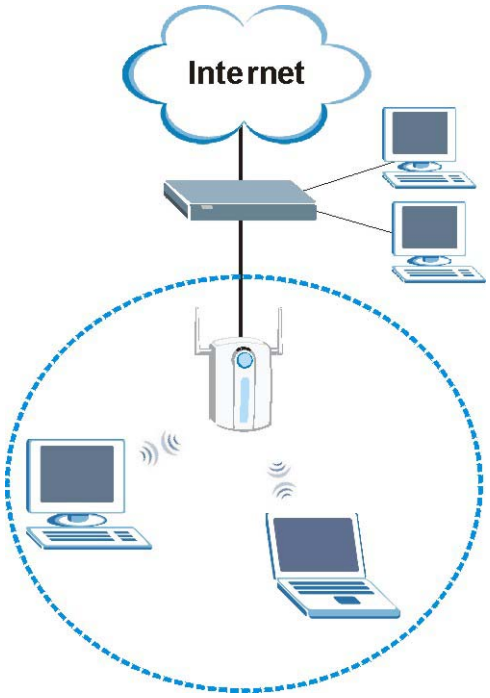
1.3 Application Overview

This section describes some network applications for the NWD2705.

1.3.1 Infrastructure

To connect to a network via an access point (AP), set the NWD2705 network type to **Infrastructure** (see Chapter 4 on page 43). Through the AP, you can access the Internet or the wired network behind the AP.

Figure 2 Application: Infrastructure



1.4 Hardware and Utility Installation

Follow the instructions in the Quick Start Guide to install the ZyXEL utility and make hardware connections.

1.4.1 ZyXEL Utility Icon

After you install and start the ZyXEL utility, an icon for the ZyXEL utility appears in the system tray.

Note: The ZyXEL utility system tray icon displays only when the NWD2705 is installed properly.

Note: When you use the ZyXEL utility, it automatically disables Wireless Zero Configuration (WZC) in Windows XP.

Figure 3 ZyXEL Utility: System Tray Icon

The color of the ZyXEL utility system tray icon indicates the status of the NWD2705. Refer to the following table for details.

Table 3 ZyXEL Utility: System Tray Icon

COLOR	DESCRIPTION
Red	The NWD2705 is not connected to a wireless network.
Green	The NWD2705 is connected to a wireless network.

1.5 Configuration Methods

To configure your NWD2705, use one of the following applications:

- Wireless Zero Configuration (WZC, the Windows XP wireless configuration tool) or WLAN AutoConfig (the Windows Vista wireless configuration tool).
- The ZyXEL utility.

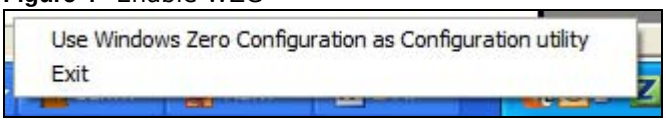
Note: Do NOT use Windows XP's Wireless Zero Configuration tool at the same time you use the ZyXEL utility.

1.5.1 Enabling Windows Wireless Configuration

Note: When you use the ZyXEL utility, it automatically disables Windows XP's wireless configuration tool.

If you want to use the Windows XP wireless configuration tool to configure the NWD2705, you need to disable the ZyXEL utility. Right-click the utility icon ( ) in the system tray and select **Exit**.

Figure 4 Enable WZC



Refer to the appendices for information on how to use the Windows wireless configuration tool to manage the NWD2705.

To reactivate the ZyXEL utility, double-click the ( ) icon on your desktop or click **Start** > **(All) Programs** > **ZyXEL Dual-Band Wireless N450 USB Adapter** > **ZyXEL Dual-Band Wireless N450 USB Adapter**.

1.5.2 Accessing the ZyXEL Utility

Double-click on the ZyXEL wireless LAN utility icon in the system tray to open the ZyXEL utility.

The ZyXEL utility screens are similar in all Microsoft Windows versions. Screens for Windows XP are shown in this User's Guide.

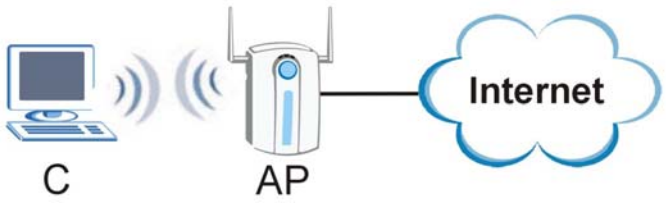
Note: Click the icon (located in the top right corner) to display the online help window.

2 Tutorial

2.1 Overview

This tutorial shows you how to join a wireless infrastructure network using the ZyXEL utility. The wireless client is labeled **C** and the Access Point is labeled **AP**.

Figure 5 Infrastructure Network



2.1.1 What You Can Do in This Tutorial

- Connect securely either to an infrastructure AP using the WPS protocol. See Section 2.2 on page 17 for details.
- Connect securely to an infrastructure AP using many of the strongest and most common encryption protocols. See Section 2.3 on page 20 for details.
- Save a your settings so that you can later connect again to an infrastructure AP with a single click. See Section 2.3.2 on page 22 for details.

2.1.2 What You Need to Know

The following term may help as you read through this section.

WPS

Wi-Fi Protected Setup (WPS) is a security protocol that lets two or more devices connect securely to one another with a minimum amount of hassle on your part. It most cases, establishing a secure connection with another WPS device is as easy as pushing a button.

2.1.3 Before You Begin

- Make sure that you have already familiarized yourself with the NWD2705's features and hardware, as described in Chapter 1 on page 11.
- You should have valid login information for an existing network Access Point, otherwise you may not be able to make a network connection right away.

2.2 Connecting to an AP using Wi-Fi Protected Setup (WPS)

This section gives you an example of how to set up your wireless network using WPS. This example uses the NWD2705 as the wireless client, and ZyXEL's NBG4615 v2 as the Access Point (AP).

Note: The Access Point must be a WPS-aware device.

There are two WPS methods for creating a secure connection. This tutorial shows you both.

- **Push Button Configuration (PBC)** - create a secure wireless network simply by pressing a button. See Section 2.2.1 on page 17.This is the easier method.
- **PIN Configuration** - create a secure wireless network simply by entering a wireless client's PIN (Personal Identification Number) in the NWD2705's interface. See Section 2.2.2 on page 18. This is the more secure method, since one device can authenticate the other.

2.2.1 Push Button Configuration (PBC)

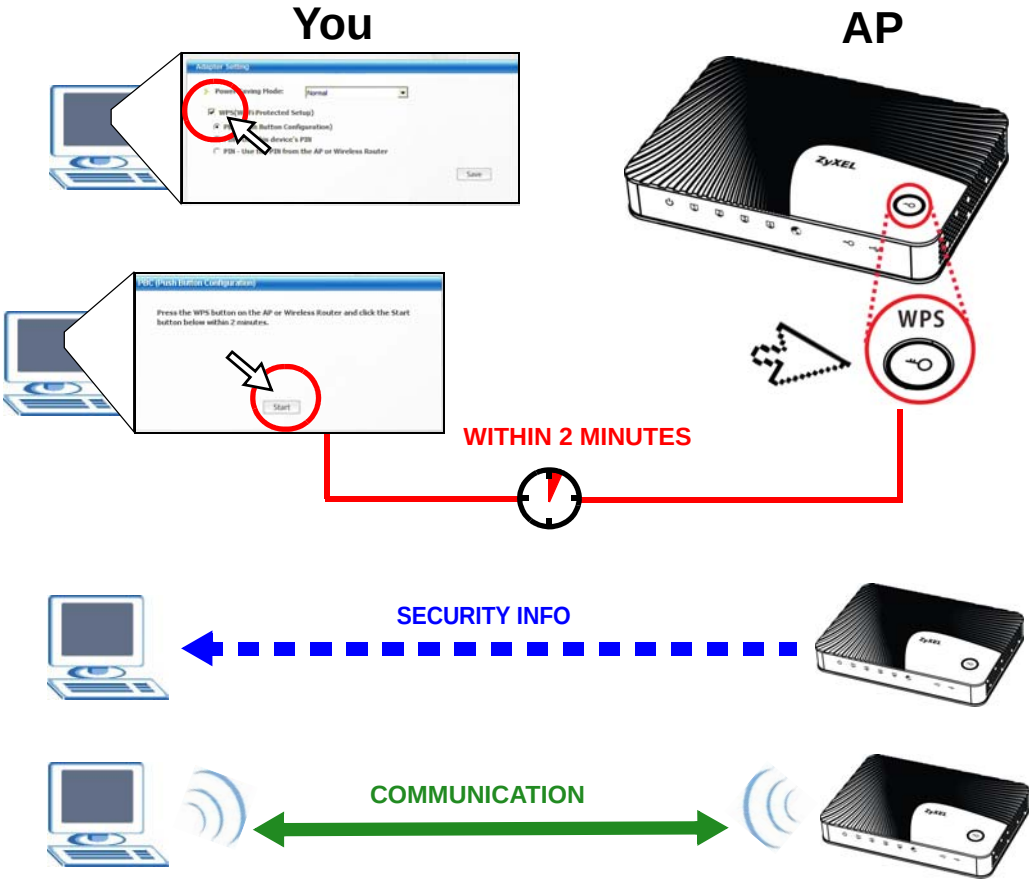
1. Make sure that your access point is turned on and that it is within range of the computer with the NWD2705 installed.
2. Make sure that you have installed the NWD2705's driver and utility on your computer.
3. In the NWD2705's utility, click the **Adapter** tab, enable **WPS** and select **PBC (Push Button Configuration)**. In the screen that appears, click **Start**.
4. Log into the AP's web configurator and locate its WPS settings section. On the NBG4615 v2, press the **Push Button** button in the **Network** > **Wireless LAN** > **WPS Station** screen.

   Note: It doesn't matter which button is pressed first. You must press the second button within two minutes of pressing the first one.

   The AP sends the proper configuration settings to the NWD2705. This may take up to two minutes. Then the NWD2705 is able to communicate with the AP securely.

The following figure shows you an example to set up wireless network and security by pressing a button on both the AP (the NBG4615 v2 in this example) and the NWD2705.

Figure 6 Example WPS Process: PBC Method



2.2.2 PIN Configuration

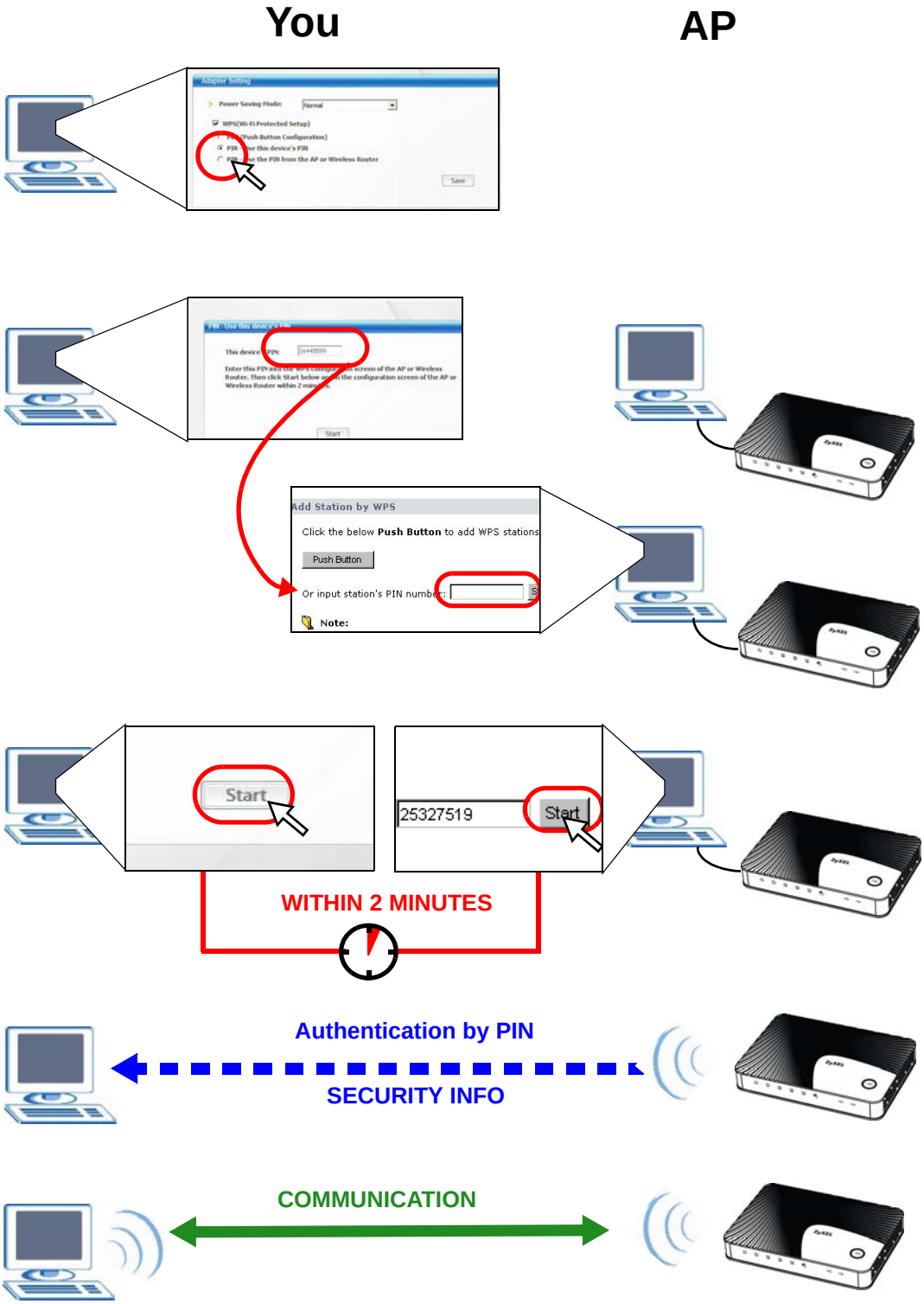
When you use the PIN configuration method, you need to use both the NWD2705's utility and the AP's configuration interface.

1. In the NWD2705's **Adapter** tab, select **WPS** and **PIN - Use this device's PIN**. Note down the PIN in the screen that appears.
2. Enter the PIN number in the AP's configuration interface. In the NBG4615 v2, use the PIN field in the **Network** > **Wireless LAN** > **WPS Station** screen.
3. Click the **Start** buttons on both the NWD2705 utility screen and the AP's configuration utility (the **WPS Station** screen on the NBG4615 v2) within two minutes.

   The NBG4615 v2 authenticates the wireless client and sends the proper configuration settings to the wireless client. This may take up to two minutes. Then the wireless client is able to communicate with the NBG4615 v2 securely.

The following figure shows you the example of configuring the wireless network and security on the NWD2705 and the AP (ZyXEL's NBG4615 v2 in this example) by using the PIN method.

Figure 7 Example WPS Process: PIN Method



2.3 Connecting to an AP Without Using WPS

There are three ways to connect the wireless client (the NWD2705) to a network without using WPS.

- Configure nothing and leave the wireless client to automatically scan for and connect to any available network that has no wireless security configured.
- Manually connect to a network (see Section 2.3.1 on page 20).
- Configure a profile to have the wireless client automatically connect to a specific network or peer computer (see Section 2.3.2 on page 22).

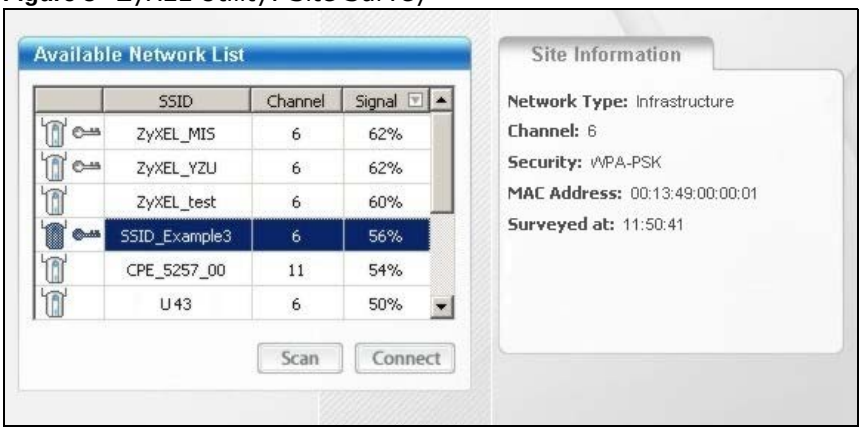
2.3.1 Manually Connecting to a Wireless LAN

This example illustrates how to manually connect your wireless client to an access point (AP) configured for WPA-PSK security and connected to the Internet. Before you connect to the access point, you must know its Service Set IDentity (SSID) and WPA-PSK pre-shared key. In this example, the AP's SSID is "SSID_Example3" and its pre-shared key is "ThisismyWPA-PSKpre-sharedkey".

After you install the ZyXEL utility and then insert the wireless client, follow the steps below to connect to a network using the **Site Survey** screen.

1 Open the ZyXEL utility and click the **Site Survey** tab to open the screen shown next.

Figure 8 ZyXEL Utility: Site Survey



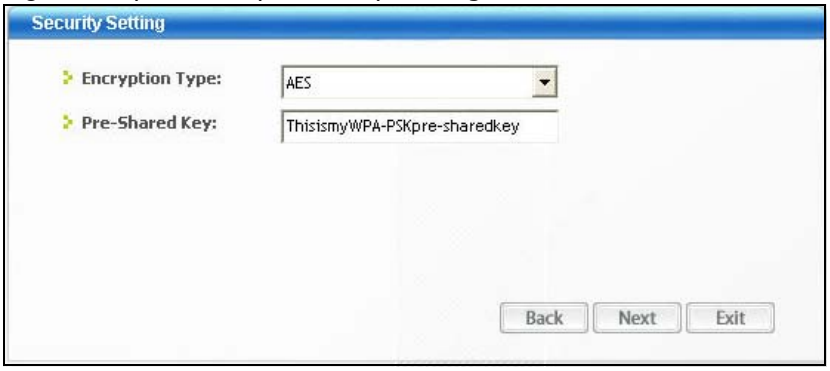
2 The wireless client automatically searches for available wireless networks. Click **Scan** if you want to search again. If no entry displays in the **Available Network List**, that means there is no wireless network available within range. Make sure the AP or peer computer is turned on, or move the wireless client closer to the AP or peer computer. See Table 4.4 on page 39 for detailed field descriptions.

3 To connect to an AP or peer computer, either click an entry in the list and then click **Connect** or double-click an entry (**SSID_Example3** in this example).

4 When you try to connect to an AP with security configured, a window will pop up prompting you to specify the security settings. Enter the pre-shared key and leave the encryption type at the default setting.

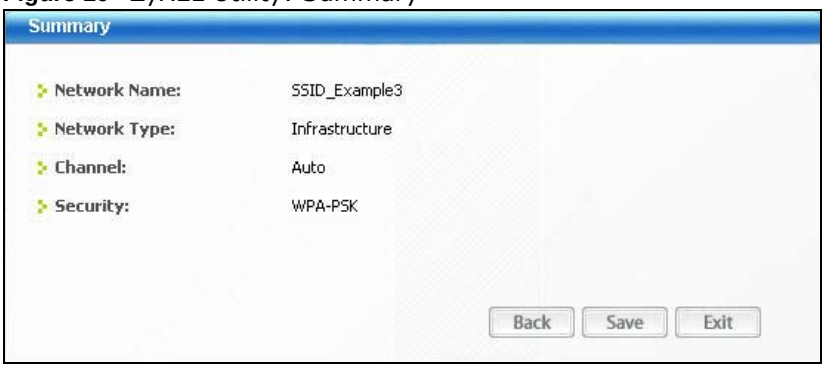
Use the **Next** button to move on to the next screen. You can use the **Back** button at any time to return to the previous screen, or the **Exit** button to return to the **Site Survey** screen.

Figure 9 ZyXEL Utility: Security Settings



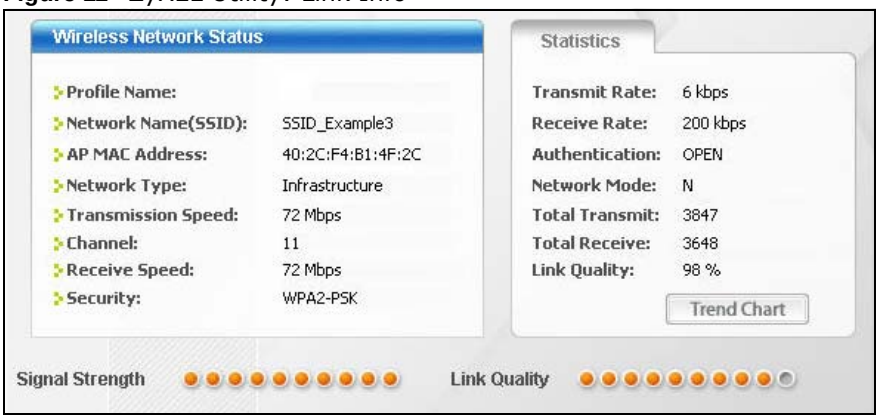
5 The **Summary** window appears. Check your settings and click **Save** to continue.

Figure 10 ZyXEL Utility: Summary



6 The ZyXEL utility returns to the **Link Info** screen while it connects to the wireless network using your settings. When the wireless link is established, the ZyXEL utility icon in the system tray turns green and the **Link Info** screen displays details of the active connection. Check the network information in the **Link Info** screen to verify that you have successfully connected to the selected network. If the wireless client is not connected to a network, the fields in this screen remain blank. See Table 4.3 on page 37 for detailed field descriptions.

Figure 11 ZyXEL Utility: Link Info



7 Open your Internet browser and enter http://www.zyxel.com or the URL of any other web site in the address bar. If you are able to access the web site, your wireless connection is successfully configured. If you cannot access the web site, check the Troubleshooting section of this User's Guide or contact your network administrator if necessary.

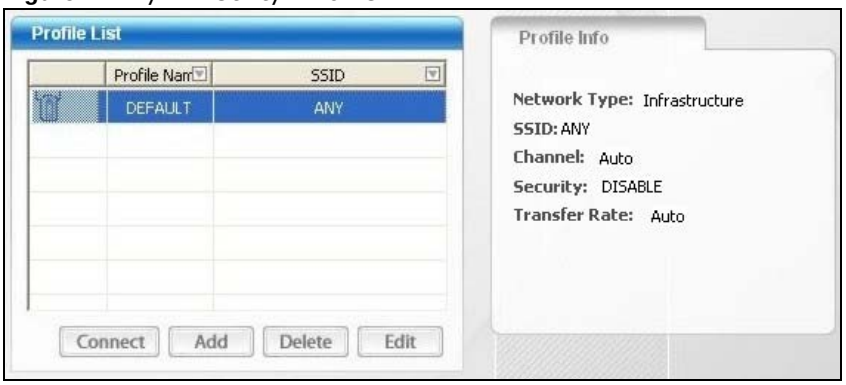
2.3.2 Creating and Using a Profile

A profile lets you automatically connect to the same wireless network every time you use the ZyXEL utility. You can also configure different profiles for different networks, for example if you connect a notebook computer to wireless networks at home and at work.

This example illustrates how to set up a profile and connect the wireless client to an access point configured for WPA-PSK security. In this example, the AP's SSID is "SSID_Example3" and its pre-shared key is "ThisismyWPA-PSKpre-sharedkey". You have chosen the profile name "PN_Example3".

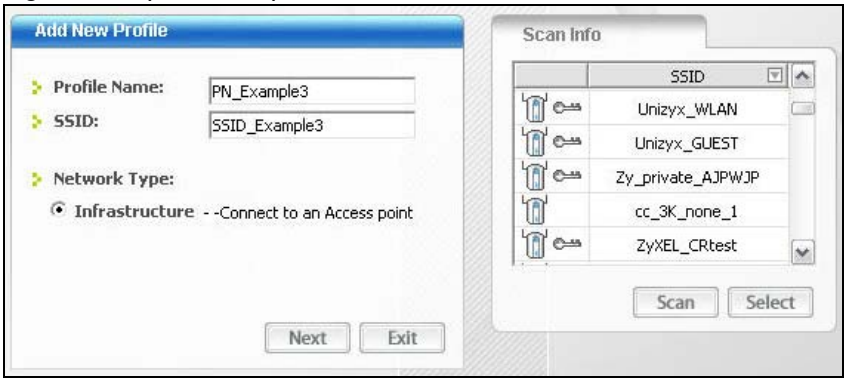
1 Open the ZyXEL utility and click the **Profile** tab to open the screen as shown. Click **Add** to configure a new profile.

Figure 12 ZyXEL Utility: Profile



2 The **Add New Profile** screen appears. The wireless client automatically searches for available wireless networks, which are displayed in the **Scan Info** box. You can also configure your profile for a wireless network that is not in the list.

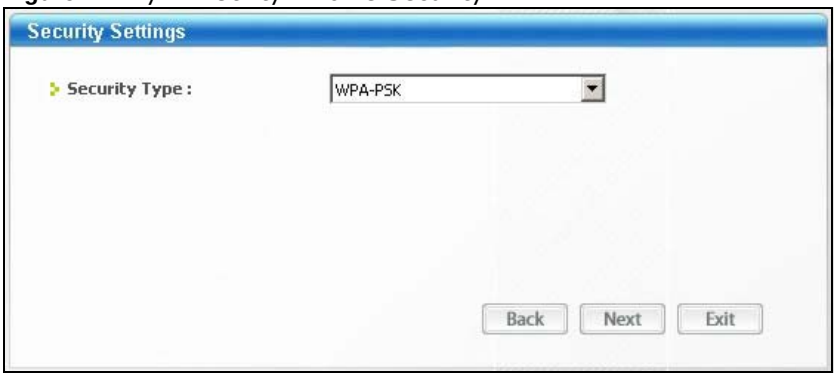
Figure 13 ZyXEL Utility: Add New Profile



3 Give the profile a descriptive name (of up to 32 printable ASCII characters). Select **Infrastructure** and either manually enter or select the AP's SSID in the **Scan Info** table and click **Select**.

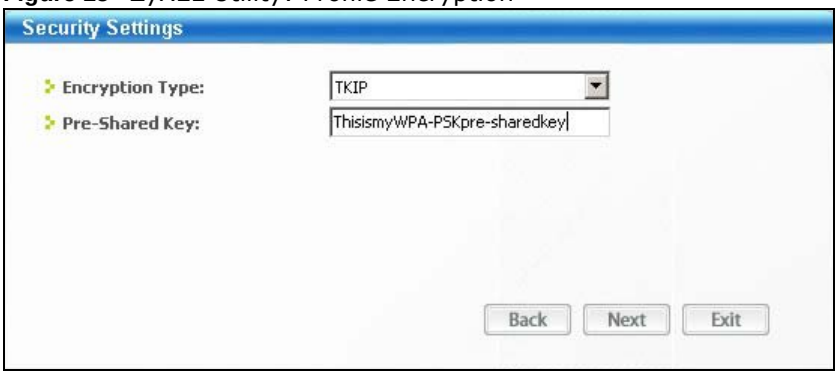
4 Choose the same encryption method as the AP to which you want to connect (In this example, WPA-PSK).

Figure 14 ZyXEL Utility: Profile Security



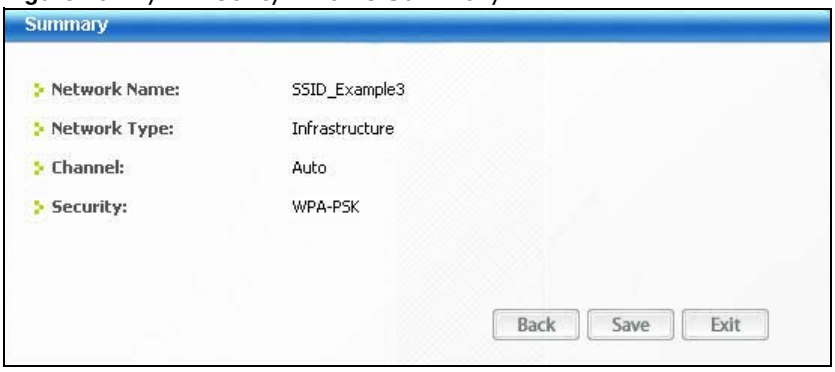
5 This screen varies depending on the encryption method you selected in the previous screen. In this example, enter the pre-shared key and leave the encryption type at the default setting.

Figure 15 ZyXEL Utility: Profile Encryption



6 Verify the profile settings in the ready-only screen. Click **Save** to save and go to the next screen.

Figure 16 ZyXEL Utility: Profile Summary



7 Click **Activate Now** to use the new profile immediately. Otherwise, click the **Activate Later** button to go back to the **Profile List** screen.

If you clicked **Activate Later** you can select the profile from the list in the **Profile** screen and click **Connect** to activate it.

Note: Only one profile can be activated and used at any given time.

Figure 17 ZyXEL Utility: Profile Activate

8 When you activate the new profile, the ZyXEL utility goes to the **Link Info** screen while it connects to the AP using your settings. When the wireless link is established, the ZyXEL utility icon in the system tray turns green and the **Link Info** screen displays details of the active connection.

9 Make sure the selected AP in the active profile is on and connected to the Internet. Open your Internet browser, enter http://www.zyxel.com or the URL of any other web site in the address bar and press ENTER. If you are able to access the web site, your new profile is successfully configured.

10 If you cannot access the Internet, go back to the **Profile** screen. Select the profile you are using and click **Edit**. Check the details you entered previously. Also, refer to the Troubleshooting section of this User's Guide or contact your network administrator if necessary.

3

Wireless LANs

3.1 Overview

This section provides background information on wireless Local Area Networks.

3.1.1 What You Can Do in This Section

- Connect securely to an AP using many of the strongest and most common encryption protocols. See Section 3.3 on page 26 for details.
- Connect securely either to an AP or computer-to-computer using WPS. See Section 3.4 on page 28 for details.

3.1.2 What You Need to Know

The following terms and concepts may help as you read through this section.

Server

When two or more devices are connected digitally to form a network, the one that distributes data to the other devices is known as the "server". A RADIUS (Remote Authentication Dial-In User Service) is a kind of server that manages logins and logout, among other things, for the network to which it is connected.

Client

When two or more devices are connected digitally to form a network, the one that contacts and obtains data from a server is known as the "client". Each client is designed to work with one or more specific kinds of servers, and each server requires a specific kind of client. Wireless adapters are clients that connect to a network server through an AP.

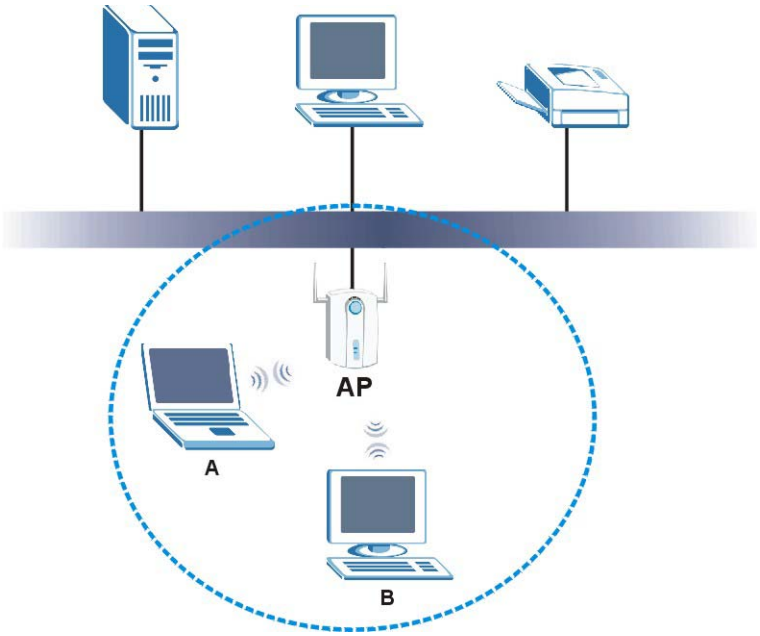
3.1.3 Before You Begin

- You should have valid login information for an existing network Access Point, otherwise you may not be able to make a network connection right away.

3.2 Wireless LAN Overview

The following figure provides an example of a wireless network with an AP.

Figure 18 Example of a Wireless Network



The wireless network is the part in the blue circle. In this wireless network, devices **A** and **B** are called wireless clients. The wireless clients use the access point (AP) to interact with other devices (such as the printer) or with the Internet

Every wireless network must follow these basic guidelines.

- Every device in the same wireless network must use the same SSID.

  The SSID is the name of the wireless network. It stands for Service Set IDentity.
- If two wireless networks overlap, they should use a different channel.

  Like radio stations or television channels, each wireless network uses a specific channel, or frequency, to send and receive information.
- Every device in the same wireless network must use security compatible with the AP or peer computer.

  Security stops unauthorized devices from using the wireless network. It can also protect the information that is sent in the wireless network.

3.3 Wireless LAN Security

Wireless LAN security is vital to your network to protect wireless communications.

If you do not enable any wireless security on your NWD2705, the NWD2705's wireless communications are accessible to any wireless networking device that is in the coverage area.

3.3.1 WEP

3.3.1.1 Data Encryption

WEP (Wired Equivalent Privacy) encryption scrambles all data packets transmitted between the NWD2705 and the AP or other wireless stations to keep network communications private. Both the wireless stations and the access points must use the same WEP key for data encryption and decryption.

There are two ways to create WEP keys in your NWD2705.

- Automatic WEP key generation based on a "password phrase" called a passphrase. The passphrase is case sensitive. You must use the same passphrase for all WLAN adapters with this feature in the same WLAN.

  For WLAN adapters without the passphrase feature, you can still take advantage of this feature by writing down the four automatically generated WEP keys from the **Security Settings** screen of the ZyXEL utility and entering them manually as the WEP keys in the other WLAN adapter(s).
- Enter the WEP keys manually.

  Your NWD2705 allows you to configure up to four 64-bit or 128-bit WEP keys. Only one key is used as the default key at any one time.

3.3.1.2 Authentication Type

The IEEE 802.11b/g/n standard describes a simple authentication method between the wireless stations and AP. Three authentication types are defined: **Auto**, **Open** and **Shared**.

- **Open** mode is implemented for ease-of-use and when security is not an issue. The wireless station and the AP or peer computer do not share a secret key. Thus the wireless stations can associate with any AP or peer computer and listen to any transmitted data that is not encrypted.
- **Shared** mode involves a shared secret key to authenticate the wireless station to the AP or peer computer. This requires you to enable the wireless LAN security and use same settings on both the wireless station and the AP or peer computer.
- **Auto** authentication mode allows the NWD2705 to switch between the open system and shared key modes automatically. Use the auto mode if you do not know the authentication mode of the other wireless stations.

3.3.2 WPA-PSK and WPA2-PSK

Wi-Fi Protected Access (WPA) is a subset of the IEEE 802.11i standard. WPA2 (IEEE 802.11i) is a wireless security standard that defines stronger encryption, authentication and key management than WPA.

Key differences between WPA(2) and WEP are improved data encryption and user authentication.

Both WPA and WPA2 improve data encryption by using Temporal Key Integrity Protocol (TKIP), Message Integrity Check (MIC) and IEEE 802.1x. WPA and WPA2 use Advanced Encryption Standard (AES) in the Counter mode with Cipher block chaining Message authentication code Protocol (CCMP) to offer stronger encryption than TKIP.

The encryption mechanisms used for WPA(2) and WPA(2)-PSK are the same. The only difference between the two is that WPA(2)-PSK uses a simple common password, instead of user-specific credentials. The common-password approach makes WPA(2)-PSK susceptible to brute-force password-guessing attacks but it's still an improvement over WEP as it employs a consistent,

single, alphanumeric password to derive a PMK which is used to generate unique temporal encryption keys. This prevent all wireless devices sharing the same encryption keys. (a weakness of WEP)

If both an AP and the wireless clients support WPA2-PSK, use WPA2-PSK for stronger data encryption. If the AP or the wireless clients do not support WPA2-PSK, just use WPA-PSK. Select WEP only when the AP and/or wireless clients do not support WPA-PSK or WPA2-PSK. WEP is less secure than WPA-PSK or WPA2-PSK.

3.4 Wi-Fi Protected Setup

Your NWD2705 supports WiFi Protected Setup (WPS), which is an easy way to set up a secure wireless network. WPS is an industry standard specification, defined by the Wi-Fi Alliance.

WPS allows you to quickly set up a wireless network with strong security, without having to configure security settings manually. Each WPS connection works between two devices. Both devices must support WPS (check each device's documentation to make sure).

Depending on the devices you have, you can either press a button (on the device itself, or in its configuration utility) or enter a PIN (a unique Personal Identification Number that allows one device to authenticate the other) in each of the two devices. When WPS is activated on a device, it has two minutes to find another device that also has WPS activated. Then, the two devices connect and set up a secure network by themselves.

3.4.1 Push Button Configuration

WPS Push Button Configuration (PBC) is initiated by pressing a button on each WPS-enabled device, and allowing them to connect automatically. You do not need to enter any information.

Not every WPS-enabled device has a physical WPS button. Some may have a WPS PBC button in their configuration utilities instead of or in addition to the physical button.

Take the following steps to set up WPS using the button.

1. Ensure that the two devices you want to set up are within wireless range of one another.
2. Look for a WPS button on each device. If the device does not have one, log into its configuration utility and locate the button (see the device's User's Guide for how to do this - for the NWD2705, see Section 4.6.1 on page 49).
3. Press the button on one of the devices (it doesn't matter which).
4. Within two minutes, press the button on the other device. The registrar sends the network name (SSID) and security key through an secure connection to the enrollee.

   If you need to make sure that WPS worked, check the list of associated wireless clients in the AP's configuration utility. If you see the wireless client in the list, WPS was successful.

3.4.2 PIN Configuration

Each WPS-enabled device has its own PIN (Personal Identification Number). This may either be static (it cannot be changed) or dynamic (in some devices you can generate a new PIN by clicking on a button in the configuration interface).

Use the PIN method instead of the push-button configuration (PBC) method if you want to ensure that the connection is established between the devices you specify, not just the first two devices to activate WPS in range of each other. However, you need to log into the configuration interfaces of both devices to use the PIN method.

When you use the PIN method, you must enter the PIN from one device (usually the wireless client) into the second device (usually the Access Point or wireless router). Then, when WPS is activated on the first device, it presents its PIN to the second device. If the PIN matches, one device sends the network and security information to the other, allowing it to join the network.

Take the following steps to set up a WPS connection between an access point or wireless router (referred to here as the AP) and a client device using the PIN method.

1. Ensure WPS is enabled on both devices.
2. Access the WPS section of the AP's configuration interface. See the device's User's Guide for how to do this.
3. Look for the client's WPS PIN; it will be displayed either on the device, or in the WPS section of the client's configuration interface (see the device's User's Guide for how to find the WPS PIN - for the NWD2705, see Section 4.6 on page 48).
4. Enter the client's PIN in the AP's configuration interface.

   Note: If the client device's configuration interface has an area for entering another device's PIN, you can either enter the client's PIN in the AP, or enter the AP's PIN in the client - it does not matter which.

5. Start WPS on both devices within two minutes.

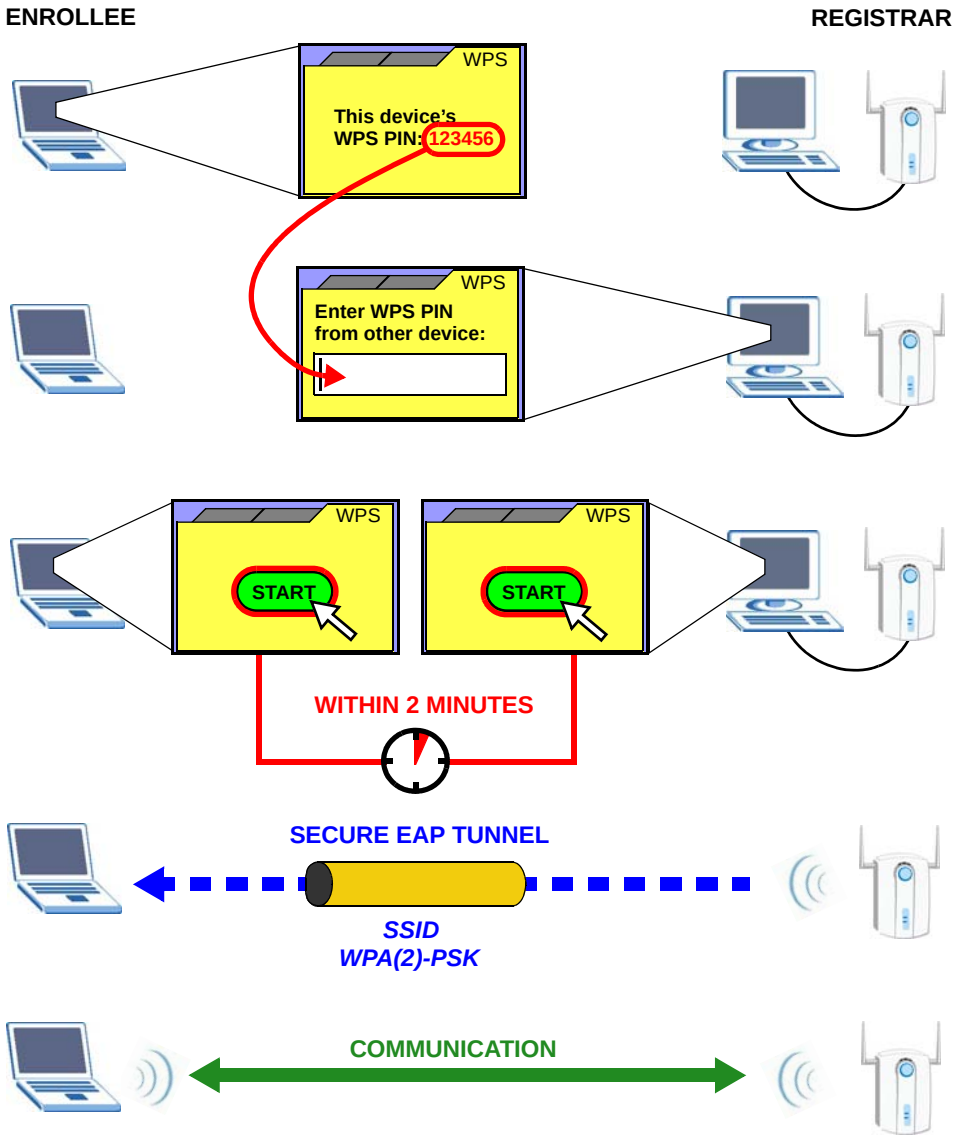
   Note: Use the configuration utility to activate WPS, not the push-button on the device itself.

6. On a computer connected to the wireless client, try to connect to the Internet. If you can connect, WPS was successful.

   If you cannot connect, check the list of associated wireless clients in the AP's configuration utility. If you see the wireless client in the list, WPS was successful.

The following figure shows a WPS-enabled wireless client (installed in a notebook computer) connecting to the WPS-enabled AP via the PIN method.

Figure 19 Example WPS Process: PIN Method

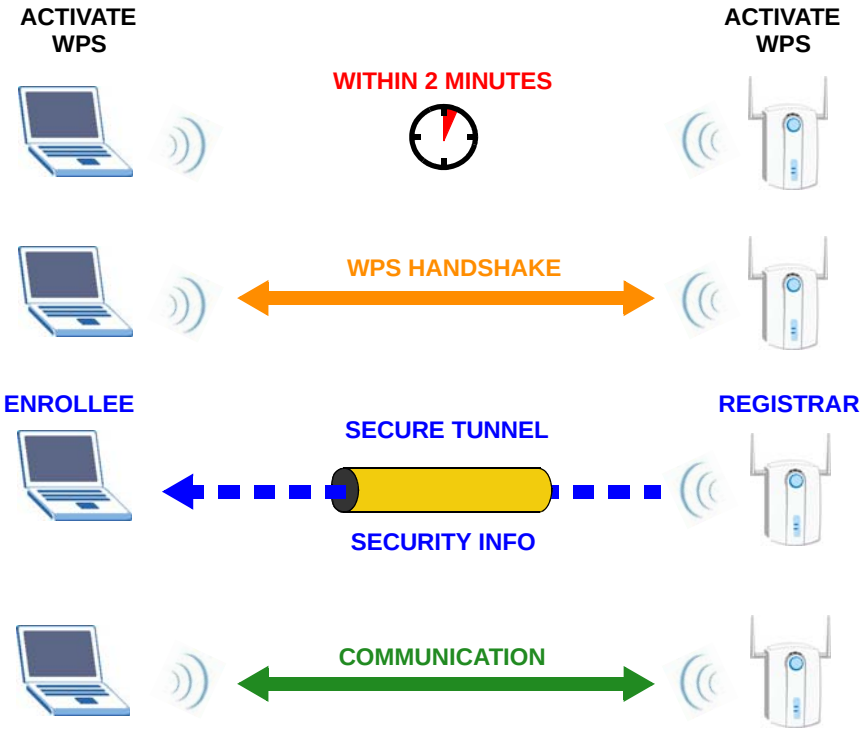


3.4.3 How WPS Works

When two WPS-enabled devices connect, each device must assume a specific role. One device acts as the registrar (the device that supplies network and security settings) and the other device acts as the enrollee (the device that receives network and security settings. The registrar creates a secure EAP (Extensible Authentication Protocol) tunnel and sends the network name (SSID) and the WPA-PSK or WPA2-PSK pre-shared key to the enrollee. Whether WPA-PSK or WPA2-PSK is used depends on the standards supported by the devices. If the registrar is already part of a network, it sends the existing information. If not, it generates the SSID and WPA(2)-PSK randomly.

The following figure shows a WPS-enabled client (installed in a notebook computer) connecting to a WPS-enabled access point.

Figure 20 How WPS works



The roles of registrar and enrollee last only as long as the WPS setup process is active (two minutes). The next time you use WPS, a different device can be the registrar if necessary.

The WPS connection process is like a handshake; only two devices participate in each WPS transaction. If you want to add more devices you should repeat the process with one of the existing networked devices and the new device.

Note that the access point (AP) is not always the registrar, and the wireless client is not always the enrollee. All WPS-certified APs can be a registrar, and so can some WPS-enabled wireless clients.

By default, a WPS devices is "unconfigured". This means that it is not part of an existing network and can act as either enrollee or registrar (if it supports both functions). If the registrar is unconfigured, the security settings it transmits to the enrollee are randomly-generated. Once a WPS-enabled device has connected to another device using WPS, it becomes "configured". A configured wireless client can still act as enrollee or registrar in subsequent WPS connections, but a configured access point can no longer act as enrollee. It will be the registrar in all subsequent WPS connections in which it is involved. If you want a configured AP to act as an enrollee, you must reset it to its factory defaults.

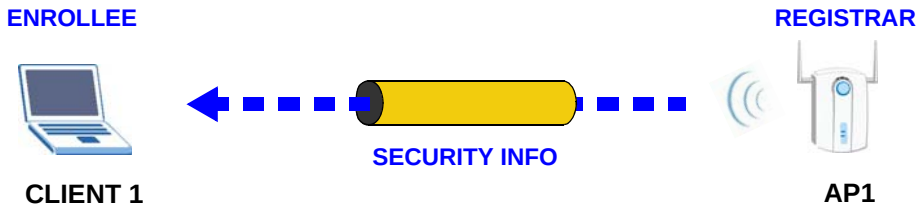
3.4.3.1 Example WPS Network Setup

This section shows how security settings are distributed in an example WPS setup.

The following figure shows an example network. In step **1**, both **AP1** and **Client 1** are unconfigured. When WPS is activated on both, they perform the handshake. In this example, **AP1**

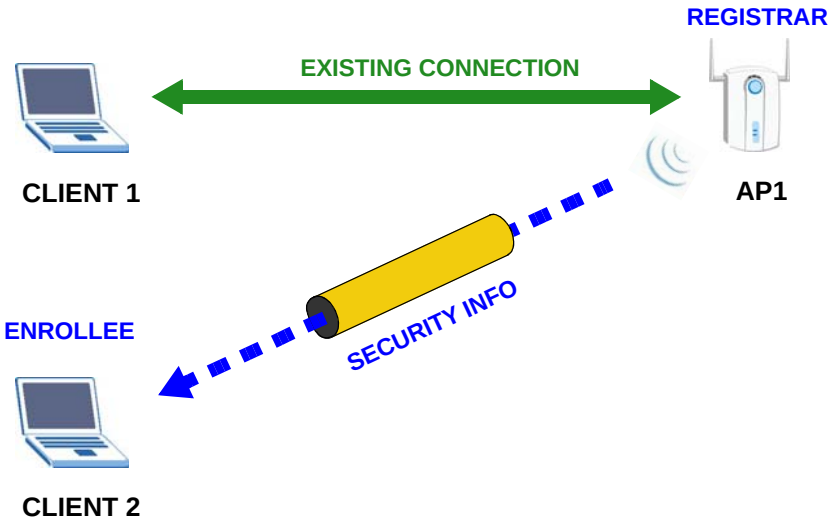
is the registrar, and **Client 1** is the enrollee. The registrar randomly generates the security information to set up the network, since it is unconfigured and has no existing information.

Figure 21 WPS: Example Network Step 1



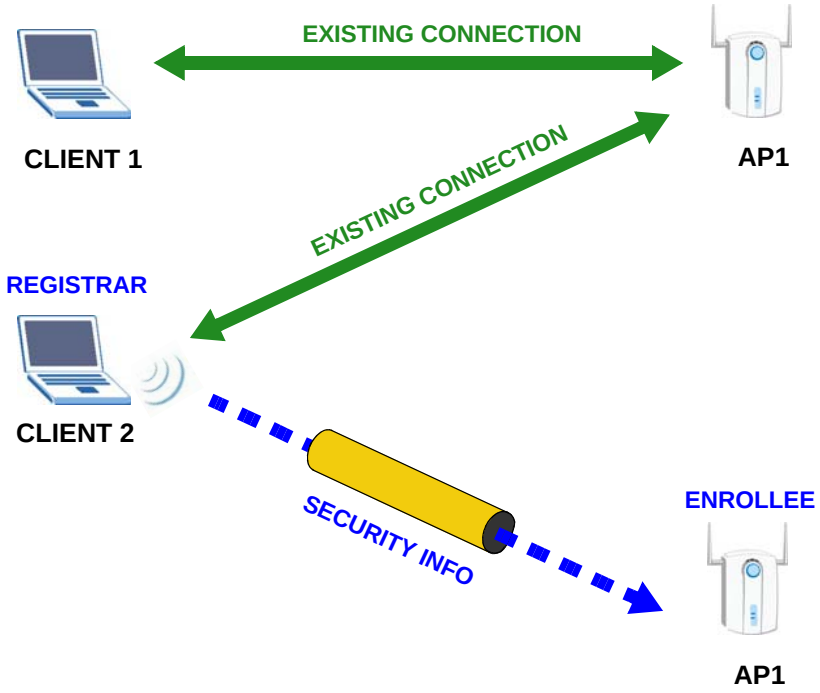
In step **2**, you add another wireless client to the network. You know that **Client 1** supports registrar mode, but it is better to use **AP1** for the WPS handshake with the new client since you must connect to the access point anyway in order to use the network. In this case, **AP1** must be the registrar, since it is configured (it already has security information for the network). **AP1** supplies the existing security information to **Client 2**.

Figure 22 WPS: Example Network Step 2



In step 3, you add another access point (**AP2**) to your network. **AP2** is out of range of **AP1**, so you cannot use **AP1** for the WPS handshake with the new access point. However, you know that **Client 2** supports the registrar function, so you use it to perform the WPS handshake instead.

Figure 23 WPS: Example Network Step 3



3.4.4 Limitations of WPS

WPS has some limitations of which you should be aware.

- When you use WPS, it works between two devices only. You cannot enroll multiple devices simultaneously, you must enroll one after the other.

  For instance, if you have two enrollees and one registrar you must set up the first enrollee (by pressing the WPS button on the registrar and the first enrollee, for example), then check that it successfully enrolled, then set up the second device in the same way.

- WPS works only with other WPS-enabled devices. However, you can still add non-WPS devices to a network you already set up using WPS.

  WPS works by automatically issuing a randomly-generated WPA-PSK or WPA2-PSK pre-shared key from the registrar device to the enrollee devices (see Section 4.4.1.3 on page 42 for information on pre-shared keys). Whether the network uses WPA-PSK or WPA2-PSK depends on the device. You can check the configuration interface of the registrar device to discover the key the network is using (if the device supports this feature). Then, you can enter the key into the non-WPS device and join the network as normal (the non-WPS device must also support WPA-PSK or WPA2-PSK).

- When you use the PBC method, there is a short period (from the moment you press the button on one device to the moment you press the button on the other device) when any WPS-enabled device could join the network. This is because the registrar has no way of identifying the "correct" enrollee, and cannot differentiate between your enrollee and a rogue device. This is a possible way for a hacker to gain access to a network.

  You can easily check to see if this has happened. WPS works between only two devices simultaneously, so if another device has enrolled your device will be unable to enroll, and will not have access to the network. If this happens, open the access point's configuration interface and look at the list of associated clients (usually displayed by MAC address). It does not matter if the access point is the WPS registrar, the enrollee, or was not involved in the WPS handshake; a rogue device must still associate with the access point to gain access to the network. Check the MAC addresses of your wireless clients (usually printed on a label on the bottom of the device). If there is an unknown MAC address you can remove it or reset the AP.

4

ZyXEL Utility: Station Mode

4.1 Overview

This section shows you how to configure your NWD2705 using the ZyXEL utility in Windows.

4.1.1 What You Can Do in This Section

- On the **Link Info** screen, you can see your current connection details, monitor signal strength and quality, and more. See Section 4.3 on page 37 for details.
- On the **Site Survey** screen, you can connect to any available unsecured wireless network in range of the NWD2705, or open the security settings screen for any secured wireless network in range. See Section 4.4 on page 39 for details.
- On the **Profile** screen, you can create, delete and manage your wireless network profiles. See Section 4.5 on page 43 for details.
- On the **Adapter** screen, you can select the frequency bands that the NWD2705 uses and enable WPS to set up a wireless network automatically. See Section 4.6 on page 48 for details.

4.1.2 What You Need to Know

The following terms and concepts may help as you read through this section.

Wired Equivalent Privacy (WEP)

WEP (Wired Equivalent Privacy) encrypts data transmitted between wired and wireless networks to keep the transmission private. Although one of the original wireless encryption protocols, WEP is also the weakest. Many people use it strictly to deter unintentional usage of their wireless network by outsiders.

Wi-Fi Protected Access (WPA)

Wi-Fi Protected Access (WPA) is a subset of the IEEE 802.11i standard. It improves data encryption by using Temporal Key Integrity Protocol (TKIP), Message Integrity Check (MIC) and IEEE 802.1x. WPA uses Advanced Encryption Standard (AES) in the Counter mode with Cipher block chaining Message authentication code Protocol (CCMP) to offer stronger encryption than TKIP. WPA applies IEEE 802.1x and Extensible Authentication Protocol (EAP) to authenticate wireless clients using an external RADIUS database. The WPA protocol affords users with vastly stronger security than the WEP protocol. It comes in two different varieties: WPA and WPA2. Always try to use WPA2 as it implements the full version of the security standard while WPA does not.

Pre-Shared Key (PSK)

A pre-shared key is a password shared between the server and the client that unlocks the algorithm used to encrypt the data traffic between them. Without the proper password, the client and the server cannot communicate.

Extensible Authentication Protocol (EAP)

An enhanced security framework designed to improve an existing security protocol, such as WPA-PSK or WPA2-PSK.

4.1.3 Before You Begin

- Make sure the ZyXEL utility is already installed. See the Quick Start Guide for more.

4.2 ZyXEL Utility Screen Summary

This section describes the ZyXEL utility screens.

Figure 24 ZyXEL Utility Menu Summary

The following table describes the menus.

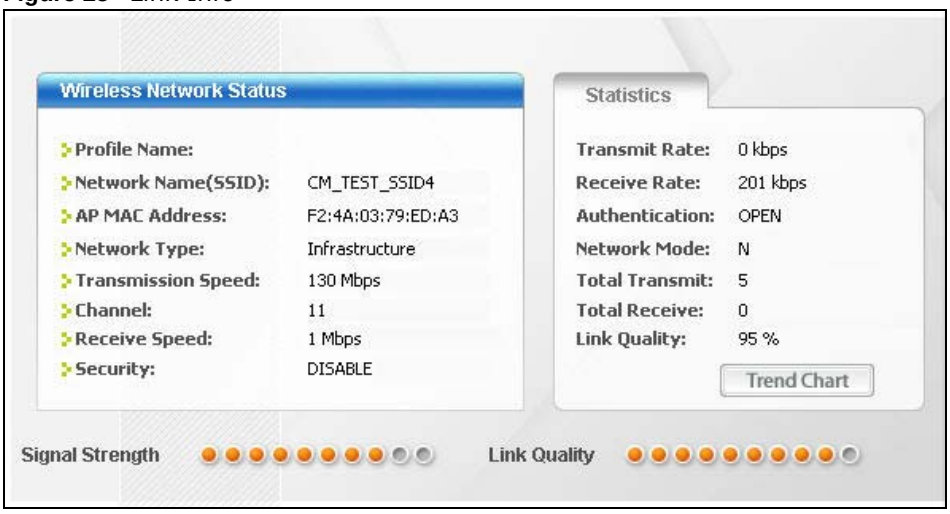
Table 4 ZyXEL Utility Menu Summary

TAB	DESCRIPTION
Link Info	Use this screen to see your current connection status, configuration and data rate statistics.
Site Survey	Use this screen to: • scan for a wireless network. • configure wireless security (if activated on the selected network). • connect to a wireless network.
Profile	Use this screen to add, delete, edit or activate a profile with a set of wireless and security settings.
Adapter	Use this screen to select the frequency bands in which the NWD2705 operates and use Wi-Fi Protected Setup (WPS).

4.3 The Link Info Screen

When the ZyXEL utility starts, the **Link Info** screen displays, showing the current configuration and connection status of your NWD2705.

Figure 25 Link Info



The following table describes the labels in this screen.

Table 5 Link Info

LABEL	DESCRIPTION
Wireless Network Status	
Profile Name	This is the name of the profile you are currently using.
Network Name (SSID)	The SSID identifies the wireless network to which a wireless station is associated. This field displays the name of the wireless device to which the NWD2705 is associated.
AP MAC Address	This field displays the MAC address of the AP or peer computer to which the NWD2705 is associated.
Network Type	This field displays the network type (**Infrastructure**) of the wireless network.
Transmission Speed	This field displays the current transmission link speed of the NWD2705 in megabits per second (Mbps).
Channel	This field displays the radio channel the NWD2705 is currently using.
Receive Speed	This field displays the current receiving speed of the NWD2705 in megabits per second (Mbps).
Security	This field displays whether data encryption is activated (**WEP** / **WPA-PSK** / **WPA2-PSK**) or inactive (**DISABLE**).
Statistics	
Transmit Rate	This field displays the current data transmission rate in kilobits per second (Kbps).
Receive Rate	This field displays the current data receiving rate in kilobits per second (Kbps).
Authentication	This field displays the authentication method of the NWD2705.
Network Mode	This field displays the wireless standard used by the selected wireless device. It shows **B** for 802.11b, **G** for 802.11g, **N** for 802.11n over 2.4GHz or **A** for 802.11n over 5GHz.
Total Transmit	This field displays the total number of data frames transmitted.
Total Receive	This field displays the total number of data frames received.

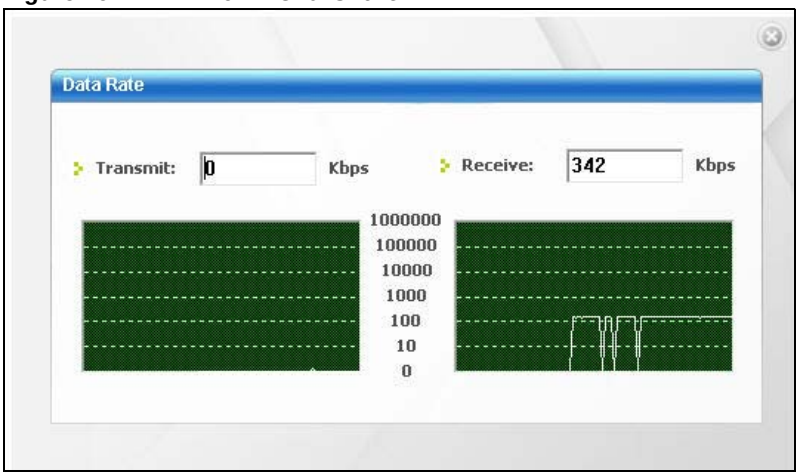
Table 5 Link Info (continued)

LABEL	DESCRIPTION
Link Quality	This field displays the signal strength of the NWD2705.
Trend Chart	Click this button to display the real-time statistics of the data rate in kilobits per second (Kbps).
Signal Strength	The status bar shows the strength of the signal. The signal strength mainly depends on the antenna output power and the distance between your NWD2705 and the AP or peer computer.
Link Quality	The status bar shows the quality of wireless connection. This refers to the percentage of packets transmitted successfully. If there are too many wireless stations in a wireless network, collisions may occur which could result in a loss of messages even though you have high signal strength.

4.3.1 Trend Chart

Click **Trend Chart** in the **Link Info** screen to display a screen as shown below. Use this screen to view real-time data traffic statistics.

Figure 26 Link Info: Trend Chart



The following table describes the labels in this screen.

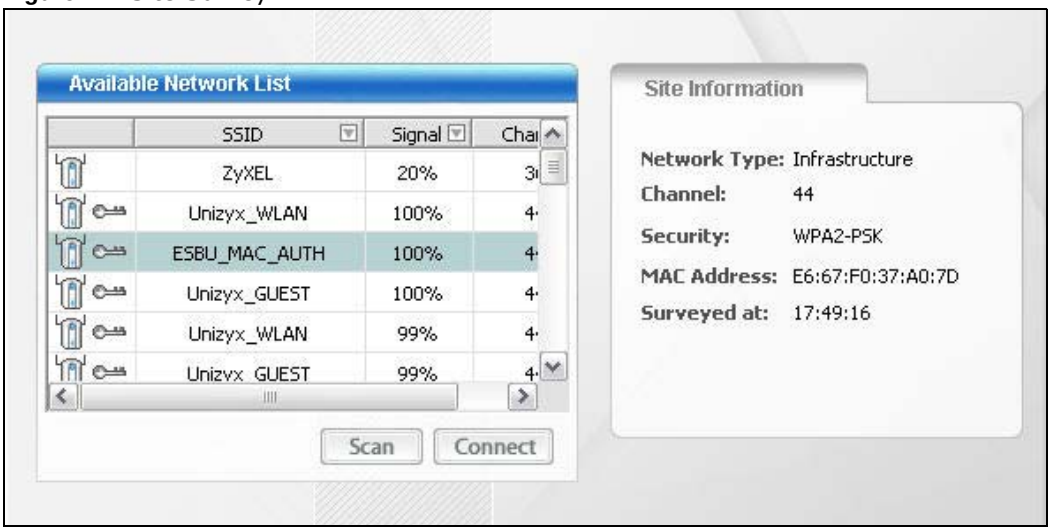
Table 6 Link Info: Trend Chart

LABEL	DESCRIPTION
Transmit	This field displays the current data transmission rate in kilobits per second (Kbps).
Receive	This field displays the current data reception rate in kilobits per second (Kbps).

4.4 The Site Survey Screen

Use the **Site Survey** screen to scan for and connect to a wireless network automatically.

Figure 27 Site Survey



The following table describes the labels in this screen.

Table 7 Site Survey

LABEL	DESCRIPTION
Available Network List	Click a column heading to sort the entries.
or ,	denotes that the wireless device is in infrastructure mode and the wireless security is activated. denotes that the wireless device is in infrastructure mode but the wireless security is deactivated.
SSID	This field displays the SSID (Service Set IDentifier) of each wireless device.
Signal	This field displays the signal strength of each wireless device.
Channel	This field displays the channel number used by each wireless device.
Scan	Click **Scan** to search for available wireless devices within transmission range.
Connect	Click **Connect** to associate to the selected wireless device.
Site Information	Click an entry in the **Available Network List** table to display the information of the selected wireless device.
Network Type	This field displays the network type (**Infrastructure**) of the wireless device.
Channel	This field displays the channel number used by each wireless device.
Security	This field shows whether data encryption is activated (**WEP**, **WPA-PSK**, or **WPA2-PSK**) or inactive (**DISABLE**).
MAC address	This field displays the MAC address of the wireless device.
Surveyed at	This field displays the time when the wireless device was scanned.

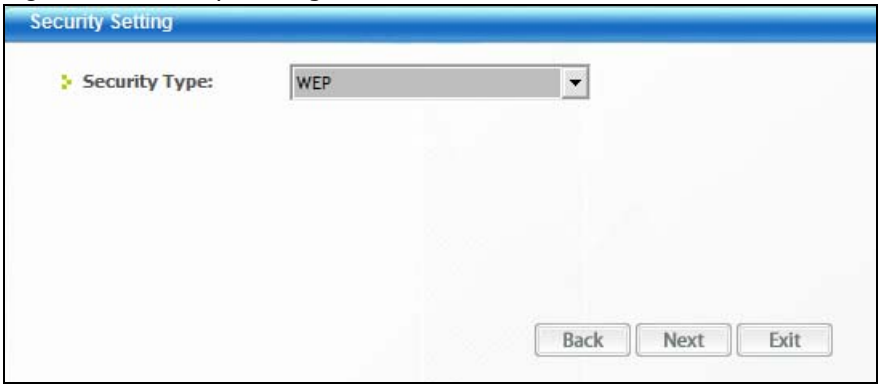
4.4.1 Security Settings

When you configure the NWD2705 to connect to a network with wireless security activated and the security settings are disabled on the NWD2705, the screen varies according to the encryption method used by the selected network.

4.4.1.1 Security Type Selection

When you choose to connect to a network that has security, you are presented with a security selection screen. Choose the security of the network you are attempting to join.

Figure 28 Security Setting Selection



The following table describes the labels in this screen.

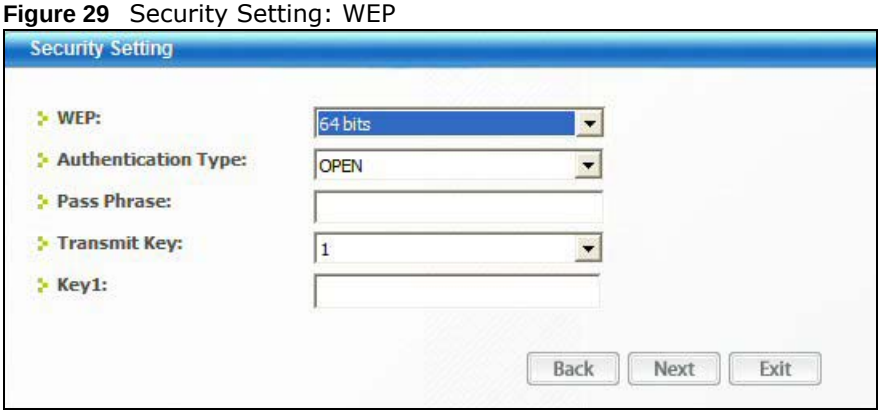
Table 8 Security Setting: WEP

LABEL	DESCRIPTION
Security Type	Select the security type that matches the security setting of the network you're trying to join. The options are: **DISABLE**, **WEP**, **WPA-PSK**, and **WPA2-PSK**.
Back	Click **Back** to go to the **Site Survey** screen to select and connect to another network.
Next	Click **Next** to confirm your selections and advance to the **Security Settings** screen that corresponds to the one you select here.
Exit	Click **Exit** to return to the **Site Survey** screen without saving.

4.4.1.2 WEP Encryption

Configure WEP security in this screen.

Figure 29 Security Setting: WEP



The following table describes the labels in this screen.

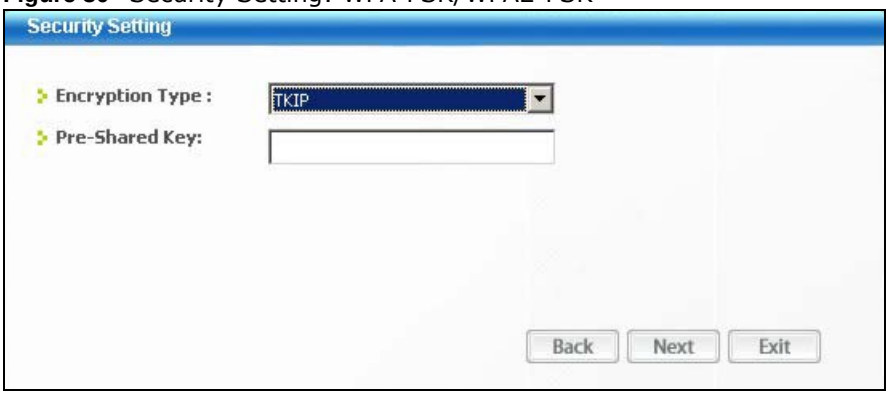
Table 9 Security Setting: WEP

LABEL	DESCRIPTION
Security Settings	
WEP	Select **64 bits** or **128 bits** to activate WEP encryption and then fill in the related fields.
Authentication Type	Select an authentication method. Choices are **OPEN** and **SHARED**. Refer to Section 3.3.1.2 on page 27 for more information.
Pass Phrase	Enter a passphrase of up to 32 case-sensitive printable characters. As you enter the passphrase, the NWD2705 automatically generates four different WEP keys and displays the first in the key field below.
Transmit Key	Select a default WEP key to use for data encryption. The key displays in the adjacent field.
Key x (where x is a number between 1 and 4)	Select this option if you want to manually enter the WEP keys. Enter the WEP key in the field provided. If you select **64 bits** in the **WEP** field. Enter either 10 hexadecimal digits in the range of "A-F", "a-f" and "0-9" (for example, 11AA22BB33) for HEX key type. or Enter 5 ASCII characters (case sensitive) ranging from "a-z", "A-Z" and "0-9" (for example, MyKey) for ASCII key type. If you select **128 bits** in the **WEP** field, Enter either 26 hexadecimal digits in the range of "A-F", "a-f" and "0-9" (for example, 00112233445566778899AABBCC) for HEX key type or Enter 13 ASCII characters (case sensitive) ranging from "a-z", "A-Z" and "0-9" (for example, MyKey12345678) for ASCII key type. Note: The values for the WEP keys must be set up exactly the same on all wireless devices in the same wireless LAN. ASCII WEP keys are case sensitive.
Back	Click **Back** to go to the **Site Survey** screen to select and connect to another network.
Next	Click **Next** to confirm your selections and advance to the **Summary** screen. Refer to Section 4.4.2 on page 43.
Exit	Click **Exit** to return to the **Site Survey** screen without saving.

4.4.1.3 WPA-PSK/WPA2-PSK

Configure WPA-PSK/WPA2-PSK security in this screen.

Figure 30 Security Setting: WPA-PSK/WPA2-PSK



The following table describes the labels in this screen.

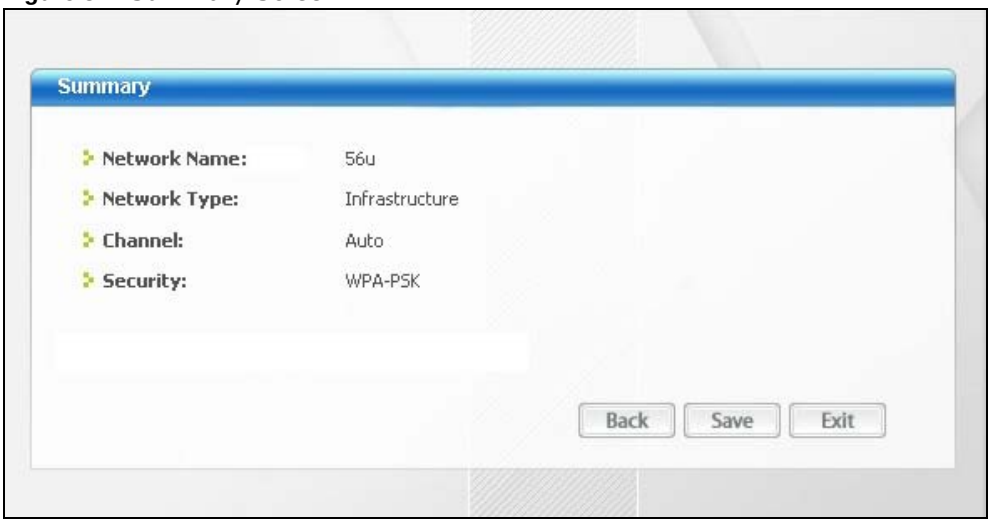
Table 10 Security Setting: WPA-PSK/WPA2-PSK

LABEL	DESCRIPTION
Encryption Type	The encryption mechanisms used for WPA/WPA2 and WPA-PSK/WPA2-PSK are the same. The only difference between the two is that WPA-PSK/WPA2-PSK uses a simple common password, instead of user-specific credentials. Select the encryption type (**TKIP** or **AES**) for data encryption. Refer to Section 3.3.2 on page 27 for more information.
Pre-Shared Key	Type a pre-shared key (same as the AP or peer device) of between 8 and 63 case-sensitive ASCII characters (including spaces and symbols) or 64 hexadecimal characters.
Back	Click **Back** to go to the **Site Survey** screen to select and connect to another network.
Next	Click **Next** to confirm your selections and advance to the **Summary** screen. Refer to Section 4.4.2 on page 43.
Exit	Click **Exit** to return to the **Site Survey** screen without saving.

4.4.2 Summary Screen

Use this screen to confirm and save the security settings.

Figure 31 Summary Screen



The following table describes the labels in this screen.

Table 11 Summary Screen

LABEL	DESCRIPTION
Network Name (SSID)	This field displays the SSID previously entered.
Network Type	This field displays the network type (**Infrastructure**) of the wireless device.
Channel	This field displays the channel number used by the profile.
Security	This field shows whether data encryption is activated (**WEP**, **WPA-PSK**, or **WPA2-PSK**) or inactive (**DISABLE**).
Back	Click **Back** to return to the previous screen.
Save	Click **Save** to save the changes back to the NWD2705 and display the **Link Info** screen.
Exit	Click **Exit** to discard changes and return to the **Site Survey** screen.

4.5 The Profile Screen

A profile is a set of wireless parameters that you need to connect to a wireless network. With a profile activated, each time you start the NWD2705, it automatically scans for the specific SSID and joins that network with the pre-defined wireless security settings. If the specified network is not available, the NWD2705 cannot connect to a network.

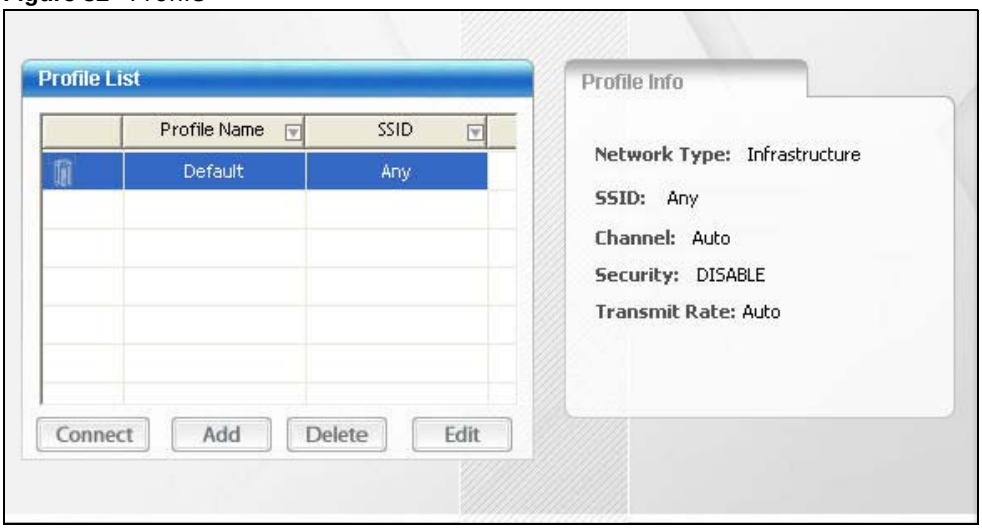
If you do not configure and activate a profile, each time you start the NWD2705, the NWD2705 uses the default profile to connect to any available network that has no security enabled.

The default profile is a profile that allows you to connect to any SSID that has no security enabled.

Click the **Profile** tab in the ZyXEL utility program to display the **Profile** screen as shown next.

The profile function allows you to save the wireless network settings in this screen, or use one of the pre-configured network profiles.

Figure 32 Profile



The following table describes the labels in this screen.

Table 12 Profile

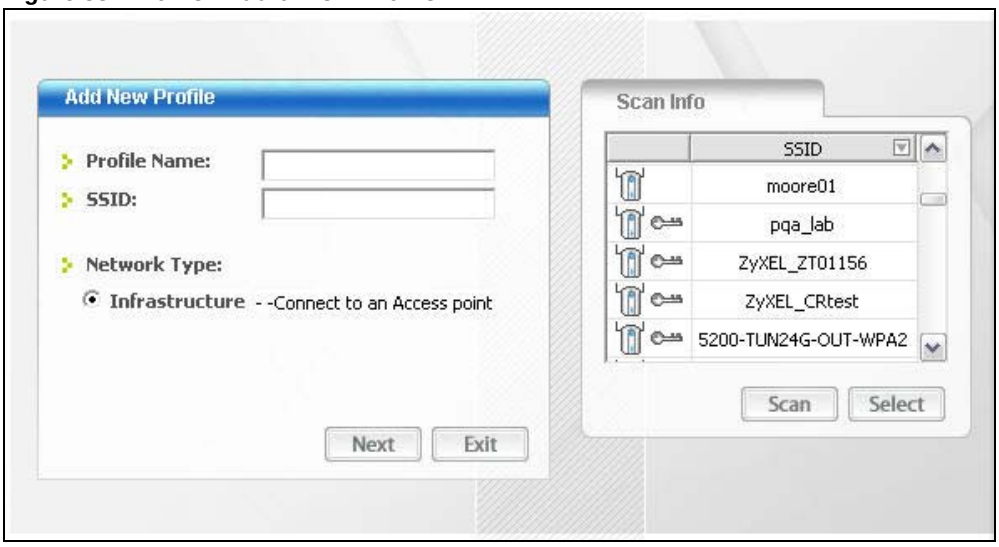
LABEL	DESCRIPTION
Profile List	Click a column heading to sort the entries.
, or	denotes that the wireless device is in infrastructure mode and the wireless security is activated. denotes that the wireless device is in infrastructure mode but the wireless security is deactivated.
Profile Name	This is the name of the pre-configured profile.
SSID	This is the SSID of the wireless network to which the selected profile associate.
Connect	To use and activate a previously saved network profile, select a pre-configured profile name in the table and click **Connect**.
Add	To add a new profile into the table, click **Add**.
Delete	To delete an existing wireless network configuration, select a profile in the table and click **Delete**.
Edit	To edit an existing wireless network configuration, select a profile in the table and click **Edit**.
Profile Info	The following fields display detailed information of the selected profile in the **Profile List** table.
Network Type	This field displays the network type (**Infrastructure**) of the profile.
SSID	This field displays the network's Service Set IDentity (the name of the network).
Channel	This field displays the channel number used by the profile.
Security	This field shows whether data encryption is activated (**WEP**, **WPA-PSK**, or **WPA2-PSK**) or inactive (**DISABLE**).
Transmit Rate	This field displays the transmission speed of the selected profile in megabits per second (Mbps).

4.5.1 Adding a New Profile

Follow the steps below to add a new profile.

1 Click **Add** in the **Profile** screen. An **Add New Profile** screen displays as shown next.

Figure 33 Profile: Add a New Profile



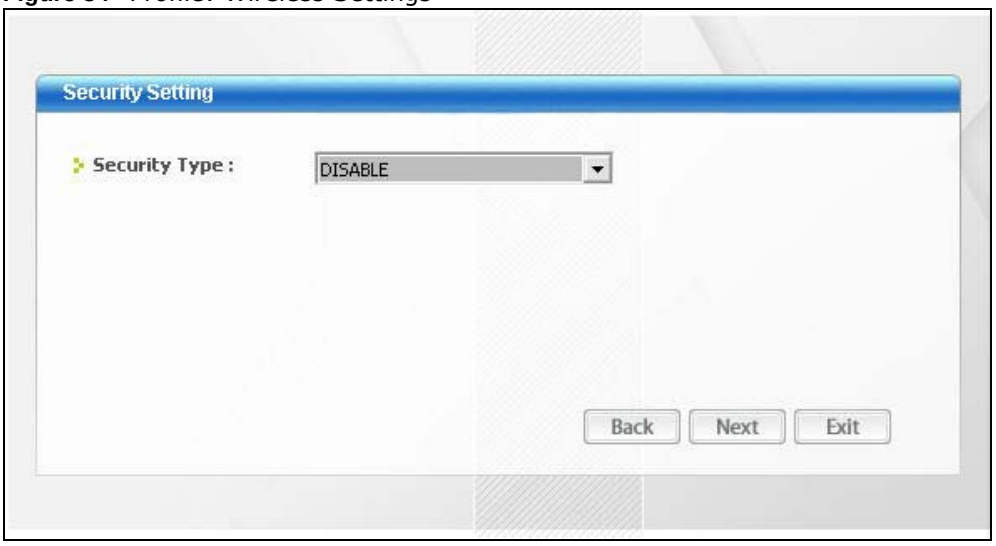
The following table describes the labels in this screen.

Table 13 Profile: Add a New Profile

LABEL	DESCRIPTION
Add New Profile	
Profile Name	Enter a descriptive name in this field.
SSID	Select an available wireless device in the **Scan Info** table and click **Select**, or enter the SSID of the wireless device to which you want to associate in this field manually. Otherwise, enter **Any** to have the NWD2705 associate to any AP or roam between any infrastructure wireless networks.
Network Type	Select **Infrastructure** to associate to an AP.
Next	Click **Next** to go to the next screen.
Exit	Click **Exit** to go back to the previous screen without saving.
Scan Info	This table displays the information of the available wireless networks within the transmission range.
or	denotes that the wireless device is in infrastructure mode and the wireless security is activated. denotes that the wireless device is in infrastructure mode but the wireless security is deactivated.
SSID	This field displays the SSID (Service Set IDentifier) of each AP or peer device.
Scan	Click **Scan** to search for available wireless devices within transmission range.
Select	Select an available wireless device in the table and click **Select** to add it to this profile. Whenever you activate this profile, the NWD2705 associates to the selected wireless network only.

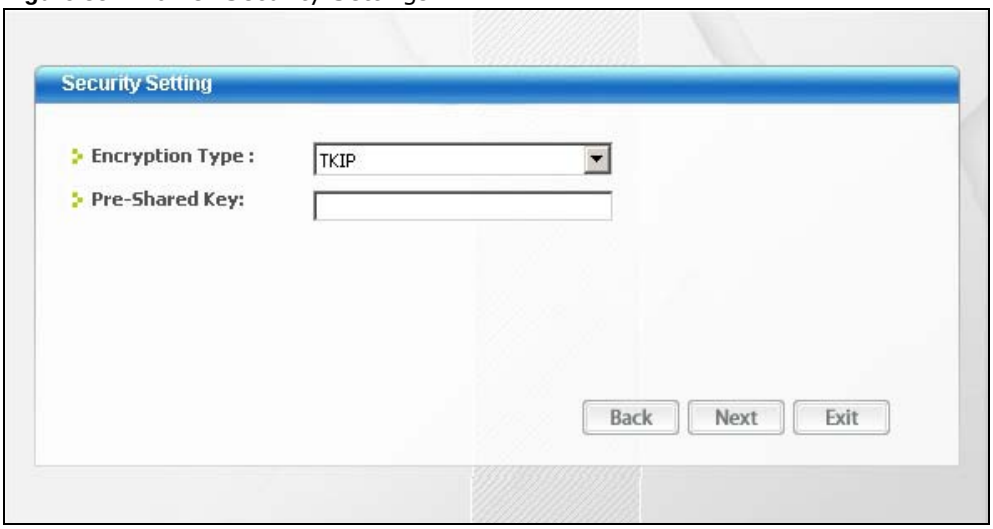
2 Select **WEP**, **WPA-PSK** or **WPA2-PSK** from the drop-down list box to enable data encryption. Otherwise, select **DISABLE** to allow the NWD2705 to communicate with the access points or other peer wireless computers without any data encryption, and skip to step 5.

Figure 34 Profile: Wireless Settings



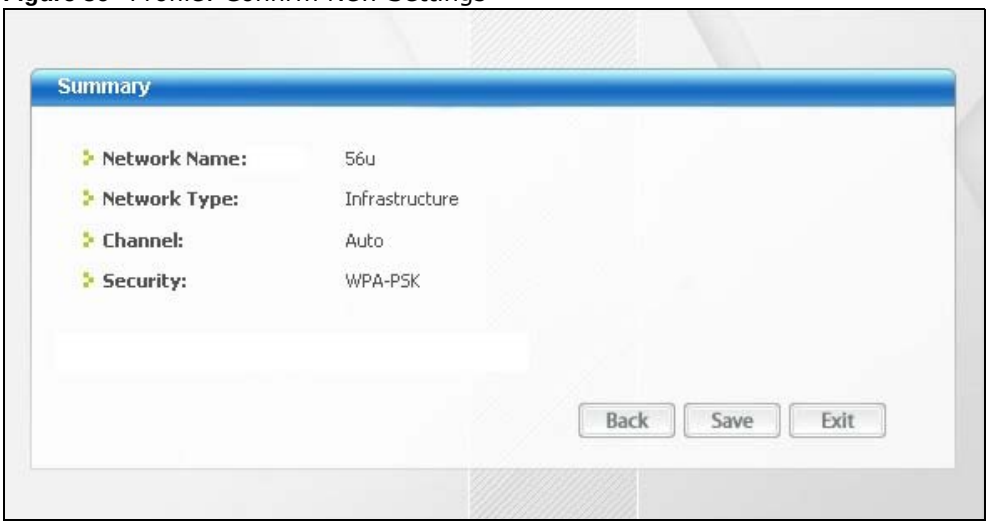
3 The screen varies depending on the encryption method you select in the previous screen. The settings must be exactly the same on the AP or other peer wireless computers as they are on the NWD2705. Refer to Section 4.4.1 on page 40 for detailed information on wireless security configuration.

Figure 35 Profile: Security Settings



4 This read-only screen shows a summary of the new profile settings. Verify that the settings are correct. Click **Save** to save and go to the next screen. Click **Back** to return to the previous screen. Otherwise, click **Exit** to go back to the **Profile** screen without saving.

Figure 36 Profile: Confirm New Settings



5 To use this network profile, click the **Activate Now** button. Otherwise, click the **Activate Later** button. You can activate only one profile at a time.

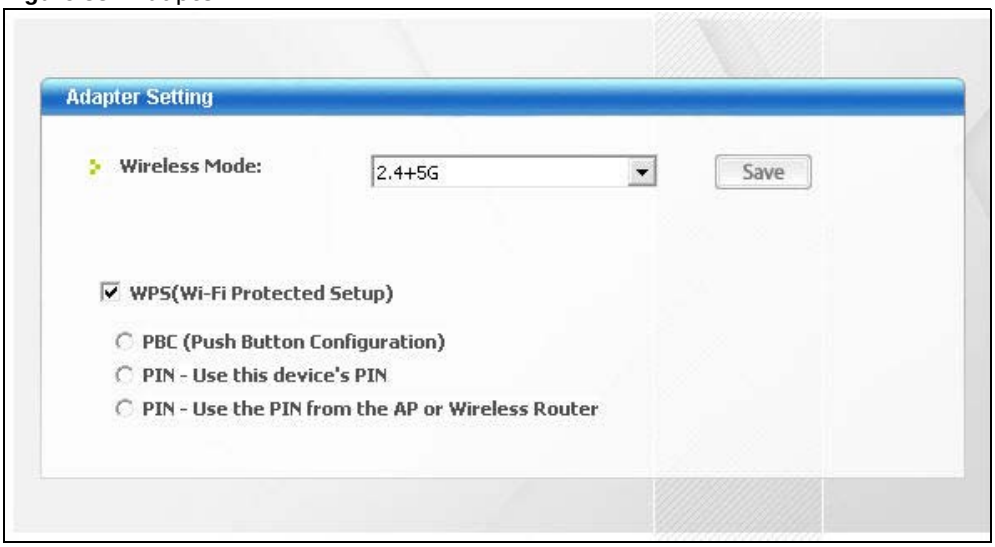
Note: Once you activate a profile, the ZyXEL utility will use that profile the next time it is started.

Figure 37 Profile: Activate the Profile

4.6 The Adapter Screen

To set the other advanced features on the NWD2705, click the **Adapter** tab.

Figure 38 Adapter



The following table describes the labels in this screen.

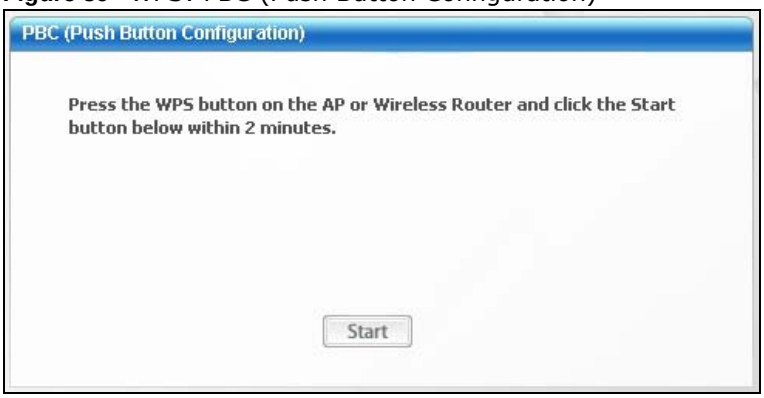
Table 14 Adapter

LABEL	DESCRIPTION
Adapter Setting	
Wireless Mode	Select **2.4+5G** to have the NWD2705 utilize either the 2.4 GHz band or the 5 GHz band. Select **2.4G** to have the NWD2705 operate in the 2.4 GHz band and connect to a 2.4 GHz wireless network (802.11b, 802.11g or 802.11n) only. Select **5G** to have the NWD2705 operate in the 5 GHz band and connect to a 5 GHz wireless network (802.11a or 802.11n) only.
WPS (WiFi Protected Setup)	Select this to enable Wi-fi Protected Setup on the NWD2705.
PBC (Push Button Configuration)	Select this to use the PBC (Push-Button Configuration) WPS mode. When you use the PBC mode you do not use a PIN. When you select this, the **PBC (Push Button Configuration)** screen appears (see Section 4.6.1 on page 49).
PIN - Use This Device's PIN	Select this to use the PIN (Personal Identification Number) WPS mode. Use this option when you want to enter the NWD2705's PIN in another WPS-enabled device. When you select this, the **PIN - Use this Device's PIN** screen appears (see Section 4.6.2 on page 49).
PIN - Use the PIN from the AP or Wireless Router	Select this to use the PIN (Personal Identification Number) WPS mode. Use this option when you want to enter the PIN from another WPS-enabled device in the NWD2705. When you select this, the **PIN - Use the PIN from the AP or Wireless Router** screen appears (see Section 4.6.3 on page 50).
Save	Click **Save** to save the changes to the NWD2705 and return to the **Link Info** screen.

4.6.1 WPS: PBC (Push Button Configuration)

This screen allows you to use the WPS Push Button Configuration mode. See Section 3.4.1 on page 28 for more information. Select **WPS** and **PBC (Push Button Configuration)** in the **Adapter** screen. The following screen displays.

Figure 39 WPS: PBC (Push Button Configuration)

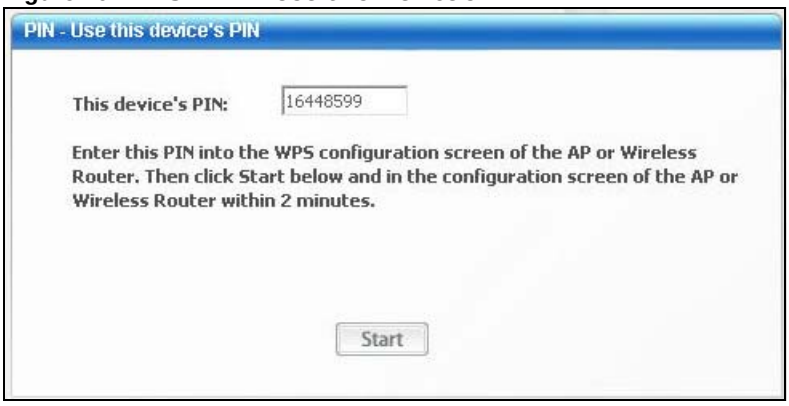

PBC (Push Button Configuration)
Press the WPS button on the AP or Wireless Router and click the Start button below within 2 minutes.
Start

Press **Start** when you want to begin the WPS process. You must also press the button on the other device within two minutes.

4.6.2 WPS: PIN - Use this Device's PIN

This screen allows you to use the WPS Personal Identification Number mode, by entering the NWD2705's unique PIN in the configuration utility of the other WPS-enabled device. See Section 3.4.2 on page 29 for more information. Select **WPS** and **PIN - Use this Device's PIN** in the **Adapter** screen. The following screen displays.

Figure 40 WPS: PIN - Use this Device's PIN


PIN - Use this device's PIN
This device's PIN:
16448599
Enter this PIN into the WPS configuration screen of the AP or Wireless Router. Then click Start below and in the configuration screen of the AP or Wireless Router within 2 minutes.
Start

The following table describes the labels in this screen.

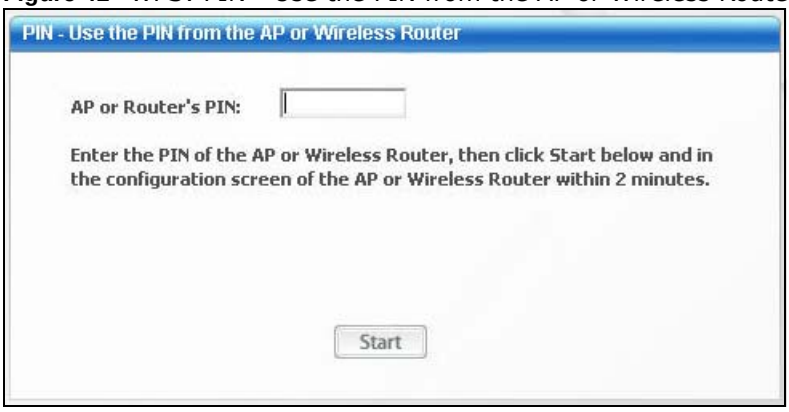
Table 15 WPS: PIN - Use this Device's PIN

LABEL	DESCRIPTION
This device's PIN	This is the NWD2705's Personal Identification Number (PIN). This field is read-only. Enter the number that displays in this field into the configuration interface of the other WPS-enabled device. Note: Each time this screen displays, the PIN is different. The PIN is valid for only one WPS transaction.
Start	Click this to start WPS. You must start WPS on the other WPS-enabled device within two minutes.

4.6.3 WPS: PIN - Use the PIN from the AP or Wireless Router

This screen allows you to use the WPS Personal Identification Number mode, by entering the PIN from another WPS-enabled device into the NWD2705's utility. See Section 3.4.2 on page 29 for more information. Select **WPS** and **PIN - Use the PIN from the AP or Wireless Router** in the **Adapter** screen. The following screen displays.

Figure 41 WPS: PIN - Use the PIN from the AP or Wireless Router


PIN - Use the PIN from the AP or Wireless Router
AP or Router's PIN:
Enter the PIN of the AP or Wireless Router, then click Start below and in the configuration screen of the AP or Wireless Router within 2 minutes.
Start

The following table describes the labels in this screen.

Table 16 WPS: PIN - Use the PIN from the AP or Wireless Router

LABEL	DESCRIPTION
AP or Router's PIN	Enter the PIN from your AP or wireless router in this field before you click Start.
Start	Click this to start WPS. You must start WPS on the other WPS-enabled device within two minutes.

5

Maintenance

5.1 Overview

This section describes how to uninstall or upgrade the ZyXEL utility.

5.1.1 What You Can Do in This Section

- Learn which version of the ZyXEL utility and device driver you're currently using. See Section 5.2 on page 52 for details.
- Remove the ZyXEL utility from your computer. See Section 5.3 on page 52 for details.
- Upgrade the ZyXEL utility. See Section 5.4 on page 53 for details.

5.1.2 What You Need to Know

The following term may help as you read through this section.

Device driver

A system file that lets other programs interact with a piece of hardware, or "device." You should never try to locate and install or uninstall device drivers yourself since they are modifications to an operating system at the core (or "kernel") level. Doing so could irreparably damage your installation.

5.1.3 Before You Begin

- Disconnect the NWD2705 if you are going to uninstall or upgrade the ZyXEL utility, save your work in any other open programs, and then close them.

5.2 The About Screen

The **About** screen displays driver and utility version numbers of the NWD2705. To display the screen as shown below, click the **About** ( ) button.

Figure 42 About

The following table describes the read-only fields in this screen.

Table 17 About

LABEL	DESCRIPTION
Driver Version	This field displays the version number of the NWD2705 driver.
Utility Version	This field displays the version number of the ZyXEL utility.

5.3 Uninstalling the ZyXEL Utility

Follow the steps below to remove (or uninstall) the ZyXEL utility from your computer.

Note: Before you uninstall the ZyXEL utility, take note of your current wireless configurations.

1 Click **Start** > **(All) Programs** > **ZyXEL Dual-Band Wireless N450 USB Adapter** > **ZyXEL Dual-Band Wireless N450 USB Adapter**.

2 When prompted, click **OK** or **Yes** to remove the driver and the utility software.

Figure 43 Uninstall: Confirm

ZyXEL Dual-Band Wireless N450 USB Adapter Uninstall
Are you sure you want to completely remove ZyXEL Dual-Band Wireless N450 USB Adapter and all of its components?
Yes
No

3 Click **OK** to complete uninstalling the software.

Figure 44 Uninstall: Complete

ZyXEL Dual-Band Wireless N450 USB Adapter Uninstall
ZyXEL Dual-Band Wireless N450 USB Adapter was successfully removed from your computer.
OK

5.4 Upgrading the ZyXEL Utility

Note: Before you uninstall the ZyXEL utility, take note of your current wireless configurations.

To perform the upgrade, follow the steps below.

1 Download the latest version of the utility from the ZyXEL web site and save the file on your computer.

2 Follow the steps in Section 5.3 on page 52 to remove the current ZyXEL utility from your computer.

3 Restart your computer when prompted.

4 Disconnect the NWD2705 from your computer.

5 Double-click on the setup program for the new utility to start the ZyXEL utility installation.

6 Insert the NWD2705 and check the version numbers in the **About** screen to make sure the new utility is installed properly.

PART II
Troubleshooting

6

Troubleshooting

This chapter offers some suggestions to solve problems you might encounter. The potential problems are divided into the following categories.

- Power, Hardware Connections, and LEDs
- Accessing the ZyXEL Utility
- Link Quality
- Problems Communicating with Other Computers

6.1 Power, Hardware Connections, and LEDs

The NWD2705 does not turn on. None of the LEDs turn on.

1. Make sure the NWD2705 is correctly installed (refer to your Quick Start Guide).
2. Restart the computer to which the NWD2705 is attached.
3. If the problem continues, contact the vendor.

One of the LEDs does not behave as expected.

1. Make sure you understand the normal behavior of the LED. See Section 1.2 on page 12.
2. Check the hardware connection. See the Quick Start Guide and Section 1.2 on page 12.
3. Restart the computer to which the NWD2705 is attached.
4. If the problem continues, contact the vendor.

6.2 Accessing the ZyXEL Utility

I cannot access the ZyXEL Utility

1. Make sure the NWD2705 is properly inserted and the LEDs are on. Refer to the Quick Start Guide for information on how to properly connect the NWD2705.
2. Use the **Device Manager** to check for possible hardware conflicts. Click **Start** > **Settings** > **Control Panel** > **System** > **Hardware** > **Device Manager**. Verify the status of the NWD2705 under **Network Adapter** (steps may vary depending on the version of Windows).
3. Install the NWD2705 on another computer.
4. If the error persists, you may have a hardware problem. In this case, you should contact your vendor.

6.3 Link Quality

The link quality and/or signal strength is poor.

1. Scan for and connect to another AP with a better link quality using the **Site Survey** screen.
2. Move your computer closer to the AP or the peer computer(s) within the transmission range.
3. There may be too much radio interference (for example from a microwave oven, or another AP using the same channel) around your wireless network. Lower the output power of each AP.
4. Make sure there are not too many wireless stations connected to a wireless network.

6.4 Problems Communicating with Other Computers

The computer with the NWD2705 installed cannot communicate with the other computer(s).

In Infrastructure Mode

- Make sure that the AP and the associated computers are turned on and working properly.
- Make sure the NWD2705 computer and the associated AP use the same SSID.
- Change the AP and the associated wireless clients to use another radio channel if interference is high.

- Make sure that the computer and the AP share the same security option and key. Verify the settings in the **Profile Security Setting** screen.
- If you are using WPA(2)-PSK security, try changing your encryption type from TKIP to AES or vice versa.

A

Legal Information

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第十二條　經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

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前項合法通信，指依電信規定作業之無線電信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

本機限在不干擾合法電臺與不受被干擾保障條件下於室內使用。
減少電磁波影響，請妥適使用。

Notices

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device has been designed for the WLAN 2.4 GHz network throughout the EC region and Switzerland, with restrictions in France.

This Class B digital apparatus complies with Canadian ICES-003. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Viewing Certifications

Go to http://www.zyxel.com to view this product's documentation and certifications.

ZyXEL Limited Warranty

ZyXEL warrants to the original end user (purchaser) that this product is free from any defects in material or workmanship for a specific period (the Warranty Period) from the date of purchase. The Warranty Period varies by region. Check with your vendor and/or the authorized ZyXEL local distributor for details about the Warranty Period of this product. During the warranty period, and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, ZyXEL will, at its discretion, repair or replace the defective products or components without charge for either parts or labor, and to whatever extent it shall deem necessary to restore the product or components to proper operating condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal or higher value, and will be solely at the discretion of ZyXEL. This warranty shall not apply if the product has been modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions.

Note

Repair or replacement, as provided under this warranty, is the exclusive remedy of the purchaser. This warranty is in lieu of all other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular use or purpose. ZyXEL shall in no event be held liable for indirect or consequential damages of any kind to the purchaser.

To obtain the services of this warranty, contact your vendor. You may also refer to the warranty policy for the region in which you bought the device at http://www.zyxel.com/web/support_warranty_info.php.

Registration

Register your product online to receive e-mail notices of firmware upgrades and information at www.zyxel.com.

Open Source Licenses

This product contains in part some free software distributed under GPL license terms and/or GPL like licenses. Open source licenses are provided with the firmware package. You can download the latest firmware at www.zyxel.com. To obtain the source code covered under those Licenses, please contact support@zyxel.com.tw to get it.

Regulatory Information

European Union

The following information applies if you use the product within the European Union.

Declaration of Conformity with Regard to EU Directive 1999/5/EC (R&TTE Directive)

Compliance Information for 2.4GHz and 5GHz Wireless Products Relevant to the EU and Other Countries Following the EU Directive 1999/5/EC (R&TTE Directive)

[Czech]	ZyXEL tímto prohlašuje, že tento zařízení je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/EC.
[Danish]	Undertegnede ZyXEL erklærer herved, at følgende udstyr udstyr overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
[German]	Hiermit erklärt ZyXEL, dass sich das Gerät Ausstattung in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EU befindet.
[Estonian]	Käesolevaga kinnitab ZyXEL seadme seadmed vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
English	Hereby, ZyXEL declares that this equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
[Spanish]	Por medio de la presente ZyXEL declara que el equipo cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
[Greek]	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ ZyXEL ΔΗΛΩΝΕΙ ΟΤΙ εξοπλισμός ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕC.
[French]	Par la présente ZyXEL déclare que l'appareil équipements est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/EC.
[Italian]	Con la presente ZyXEL dichiara che questo attrezzatura è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
[Latvian]	Ar šo ZyXEL deklarē, ka iekārtas atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
[Lithuanian]	Šiuo ZyXEL deklaruoja, kad šis įranga atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
[Dutch]	Hierbij verklaart ZyXEL dat het toestel uitrusting in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EC.
[Maltese]	Hawnhekk, ZyXEL, jiddikjara li dan tagħmir jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
[Hungarian]	Alulírott, ZyXEL nyilatkozom, hogy a berendezés megfelel a vonatkozó alapvető követelményeknek és az 1999/5/EK irányelv egyéb előírásainak.
[Polish]	Niniejszym ZyXEL oświadcza, że sprzęt jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
[Portuguese]	ZyXEL declara que este equipamento está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/EC.
[Slovenian]	ZyXEL izjavlja, da je ta oprema v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/EC.
[Slovak]	ZyXEL týmto vyhlasuje, že zariadenia spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/EC.
[Finnish]	ZyXEL vakuuttaa täten että laitteet tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
[Swedish]	Härmed intygar ZyXEL att denna utrustning står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EC.
[Bulgarian]	С настоящото ZyXEL декларира, че това оборудване е в съответствие със съществените изисквания и другите приложими разпоредбите на Директива 1999/5/ЕС.
[Icelandic]	Hér með lýsir, ZyXEL því yfir að þessi búnaður er í samræmi við grunnkröfur og önnur viðeigandi ákvæði tilskipunar 1999/5/EC.

[Norwegian]	Erklærer herved ZyXEL at dette utstyret er I samsvar med de grunnleggende kravene og andre relevante bestemmelser I direktiv 1999/5/EF.
[Romanian]	Prin prezenta, ZyXEL declară că acest echipament este în conformitate cu cerinţele esenţiale şi alte prevederi relevante ale Directivei 1999/5/EC.

National Restrictions

This product may be used in all EU countries (and other countries following the EU directive 1999/5/EC) without any limitation except for the countries mentioned below:

Ce produit peut être utilisé dans tous les pays de l'UE (et dans tous les pays ayant transposés la directive 1999/5/CE) sans aucune limitation, excepté pour les pays mentionnés ci-dessous:

Questo prodotto è utilizzabile in tutte i paesi EU (ed in tutti gli altri paesi che seguono le direttive EU 1999/5/EC) senza nessuna limitazione, eccetto per i paesii menzionati di seguito:

Das Produkt kann in allen EU Staaten ohne Einschränkungen eingesetzt werden (sowie in anderen Staaten die der EU Direktive 1995/5/CE folgen) mit Außnahme der folgenden aufgeführten Staaten:

In the majority of the EU and other European countries, the 2, 4- and 5-GHz bands have been made available for the use of wireless local area networks (LANs). Later in this document you will find an overview of countries inwhich additional restrictions or requirements or both are applicable.

The requirements for any country may evolve. ZyXEL recommends that you check with the local authorities for the latest status of their national regulations for both the 2,4- and 5-GHz wireless LANs.

The following countries have restrictions and/or requirements in addition to those given in the table labeled "*Overview of Regulatory Requirements for Wireless LANs*":.

Overview of Regulatory Requirements for Wireless LANs			
Frequency Band (MHz)	Max Power Level (EIRP)[1] (mW)	Indoor ONLY	Indoor and Outdoor
2400-2483.5	100		V
5150-5350	200	V	
5470-5725	1000		V

Belgium

The Belgian Institute for Postal Services and Telecommunications (BIPT) must be notified of any outdoor wireless link having a range exceeding 300 meters. Please check http://www.bipt.be for more details.

Draadloze verbindingen voor buitengebruik en met een reikwijdte van meer dan 300 meter dienen aangemeld te worden bij het Belgisch Instituut voor postdiensten en telecommunicatie (BIPT). Zie http://www.bipt.be voor meer gegevens.

Les liaisons sans fil pour une utilisation en extérieur d'une distance supérieure à 300 mètres doivent être notifiées à l'Institut Belge des services Postaux et des Télécommunications (IBPT). Visitez http://www.ibpt.be pour de plus amples détails.

Denmark

In Denmark, the band 5150 - 5350 MHz is also allowed for outdoor usage.

I Danmark må frekvensbåndet 5150 - 5350 også anvendes udendørs.

France

For 2.4 GHz, the output power is restricted to 10 mW EIRP when the product is used outdoors in the band 2454 - 2483.5 MHz. There are no restrictions when used indoors or in other parts of the 2.4 GHz band. Check http://www.arcep.fr/ for more details.

Pour la bande 2.4 GHz, la puissance est limitée à 10 mW en p.i.r.e. pour les équipements utilisés en extérieur dans la bande 2454 - 2483.5 MHz. Il n'y a pas de restrictions pour des utilisations en intérieur ou dans d'autres parties de la bande 2.4 GHz. Consultez http://www.arcep.fr/ pour de plus amples détails.

R&TTE 1999/5/EC		
WLAN 2.4 – 2.4835 GHz		
IEEE 802.11 b/g/n		
Location	Frequency Range (GHz)	Power (EIRP)
Indoor (No restrictions)	2.4 – 2.4835	100mW (20dBm)
Outdoor	2.4 – 2.454	100mW (20dBm)
	2.454 – 2.4835	10mW (10dBm)

Italy

This product meets the National Radio Interface and the requirements specified in the National Frequency Allocation Table for Italy. Unless this wireless LAN product is operating within the boundaries of the owner's property, its use requires a "general authorization." Please check http://www.sviluppoeconomico.gov.it/ for more details.

Questo prodotto è conforme alla specifiche di Interfaccia Radio Nazionali e rispetta il Piano Nazionale di ripartizione delle frequenze in Italia. Se non viene installato all 'interno del proprio fondo, l'utilizzo di prodotti Wireless LAN richiede una "Autorizzazione Generale". Consultare http://www.sviluppoeconomico.gov.it/ per maggiori dettagli.

Latvia

The outdoor usage of the 2.4 GHz band requires an authorization from the Electronic Communications Office. Please check http://www.esd.lv for more details.

2.4 GHz frekvenèu joslas izmantoðanai ârpus telpâm nepiecieðama atïauja no Elektronisko sakaru direkcijas. Vairâk informâcijas: http://www.esd.lv.

Notes:

1. Although Norway, Switzerland and Liechtenstein are not EU member states, the EU Directive 1999/5/EC has also been implemented in those countries.

2. The regulatory limits for maximum output power are specified in EIRP. The EIRP level (in dBm) of a device can be calculated by adding the gain of the antenna used(specified in dBi) to the output power available at the connector (specified in dBm).

List of national codes

COUNTRY	ISO 3166 2 LETTER CODE	COUNTRY	ISO 3166 2 LETTER CODE
Austria	AT	Malta	MT
Belgium	BE	Netherlands	NL
Cyprus	CY	Poland	PL
Czech Republic	CR	Portugal	PT
Denmark	DK	Slovakia	SK
Estonia	EE	Slovenia	SI
Finland	FI	Spain	ES
France	FR	Sweden	SE
Germany	DE	United Kingdom	GB
Greece	GR	Iceland	IS
Hungary	HU	Liechtenstein	LI
Ireland	IE	Norway	NO
Italy	IT	Switzerland	CH
Latvia	LV	Bulgaria	BG
Lithuania	LT	Romania	RO
Luxembourg	LU	Turkey	TR

Safety Warnings

- Do NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Do NOT expose your device to dampness, dust or corrosive liquids.
- Do NOT store things on the device.
- Do NOT install, use, or service this device during a thunderstorm. There is a remote risk of electric shock from lightning.
- Connect ONLY suitable accessories to the device.
- Ground yourself (by properly using an anti-static wrist strap, for example) whenever working with the device’s hardware or connections.
- ONLY qualified service personnel should service or disassemble this device.
- Antenna Warning! This device meets ETSI and FCC certification requirements when using the included antenna(s). Only use the included antenna(s).

Your product is marked with this symbol, which is known as the WEEE mark. WEEE stands for Waste Electronics and Electrical Equipment. It means that used electrical and electronic products should not be mixed with general waste. Used electrical and electronic equipment should be treated separately.

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